Gas Journal

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Editorial Notes

Two Important Bills

THE whole Gas Industry will follow with great interest the progress of the Gas Light and Coke Company (No. 2) Bill and the York Gas Company Bill through their House of Commons Committee Stage, which is due to open this week.

It is well known that the purpose of these Bills is to make it impossible for the local authorities concerned to render ineffective the provisions of the Gas Undertakings Act, 1934, which established the right of the tenants of Council houses to choose whether they used gas or electricity for any or all purposes. It is not suggested that local authorities as a general rule have not conserved the tenant's freedom of choice in this matter, but we have from time to time found it our duty to call attention to cases where local authorities did not appear to be willing to grant to the local gas company privileges which they were only too willing to bestow upon their own electricity departments. Of these privileges, probably the most valuable is the exclusive right to wire houses during the course of their erection.

The contention that the refusal to permit a gas company to pipe houses during their erection is unjust is countered by local authorities who adopt these methods in two principal ways. They maintain firstly that, if a tenant on going into occupation requires gas, no objection will be raised by the local authority. Secondly, they offer that a tenant desiring to use gas shall not be placed in a house provided with electrical equipment, but that he can wait until a house equipped with gas is available.

It is hardly necessary to demonstrate the futility of contentions of this kind. In the first place, it can be proved conclusively that the vast majority of persons likely to occupy Council houses have used gas in the past and desire to continue to use gas in the future. It is an anomaly, therefore, that the local authority should act upon the assumption that such persons will desire to use electricity. Further, however enthusiastic a tenant may be to take a supply of gas, he will naturally hesitate to request the gas company to pipe his house, knowing as he must do that such work will obviously entail interference with the garden which may have just been laid out, and in any case cause damage to the internal decoration of the house. It is impossible to blame such a tenant if, rather than incur the considerable inconvenience which would be caused by piping the premises, he decides to make the best of a bad job and use the electricity supply if he can afford it, and candles and paraffin if he cannot.

The second argument is even more unjust. It is well known that there is still a great scarcity of houses at rents which the working classes can afford. Many a working class woman who has suffered from bad housing conditions all her life regards the prospect of obtaining a new house as the fulfilment of one of the great ambitions of her life. Is the fact that this woman prefers gas sufficient justification for excluding her from the house which would otherwise be suitable in every respect, and placing her name at the bottom of some list of persons who desire an all-gas house, which the local authority probably never intend to provide?

It would not be difficult to enlarge upon the injustice to gas companies caused by municipal competition of this character, but we ourselves would give pride of place to the hardship occasioned to many working class women who are forced to utilize for cooking a medium to which they are not accustomed, which they do not want, and which they cannot afford.

Public Lighting

OUR article on this subject last week had quite a flattering number of reactions, and promptly brought forth an unusual crop of intended reassurances of various kinds. The type which we did not like at all told us that we need not trouble our heads about the matter, as all is well. Being still entirely unconvinced, we turned with greater comfort to evidences which were subsequently revealed to us that a large body of influential opinion agrees completely with the views which we expressed, and that, in fact, moves are on foot in authoritative quarters with the object of shaking the complacency of the all-is-well brigade.

Evidence continues to accumulate that the electricians, as far as public lighting is concerned, are at present riding on a wave of confidence. They are intensely elated by certain successes, they are passing the story of these round to one another, and hinting, in tones loud enough to be heard by every local authority on the way, that the days of gas for street lighting are numbered. We have heard this same story about other uses of gas for so many years that we might not have given it a second thought, except that they are now, as Dr. Carpenter explained in connection with Camberwell, making a par-

ticularly vigorous and dangerous onslaught, which must be met with every means at our disposal.

It is essential that every single unit of the Gas Industry should appreciate the value of the public lighting load; its retention is one of the strongest bulwarks against competition. Naturally the Central Electricity Board is doing all possible to make a success of the Grid and is concentrating on the lighting load. It is the most remunerative load; and the greater the amount of plant put down to meet the lighting demand, the more can the electricity industry offer cut rates at off-peak hours, with the aim of cutting into the day load of the Gas Industry and levelling the output curve. Our Industry—and this point is brought out on later pages by Mr. Hyde C. Burton in an analysis of the Accounts of the C.E.B.—must realize that any loss of gas lighting goes much deeper than the mere loss of revenue entailed; it paves the way to the most intense form of electrical competition in other fields.

Refrigeration

THE appearance of the first Press advertisement in the series announcing "The Great Gas Refrigerator Offer" marks the opening of the big joint campaign "by the Gas Companies of London and Middlesex, by most of the gas undertakings of Bucks, Herts, Essex, Sussex, Surrey, Kent, and by many provincial gas undertakings."

We have already referred on several occasions in these columns to this big co-operative effort, and to the fact that, to meet the demand, the world renowned refrigerator firm of Electrolux, Ltd., have ceased manufacture of their electrical models to concentrate solely on the gas-operated type. News items which reach us from all parts of the country make it quite clear, however, that the big drive extends far beyond this South Country group of gas undertakings, and that "half-a-crown a week buys the Electrolux Family Model—fixed free—5 year guarantee—5 years' free maintenance—permanent silence" will be very familiar phrases in many parts of the country in the next few weeks.

The points at the disposal of the gas refrigeration salesman are so strong that the only thing likely to mar success appears to be over-confidence. We referred in our issue of April 1 to the big counter-drive which is being made by the County of London Electric Supply Company, controlling an area of some 3,000 square miles. Those who visited the Ideal Home Exhibition at Olympia can have been left with no doubt that the electricity industry is making big efforts by putting out a wide selection of very attractive cabinets, and as regards terms it will often be a case of the two industries competing for the same half-crown.

Many of our readers will have seen the *Electrical Review* of April 17, which discussed recent developments in the domestic refrigeration field, and claimed, probably not without justification, that the gas campaign has, to a large extent, reacted favourably to the electrical industry by demonstrating to the public how useful a refrigerator is in the home. Our contemporary also confirms the impression to which we refer above that an increased number of attractive models is now available, and discloses that, in fact, no fewer than nine concerns have entered the market for the first time during the past year. The point we wish principally to make is that, although to a large extent we have got a good start, our competitors are after us, and that they have quite clearly taken the exact measure of our strength. Let those who are going to be faced with their competition be quite clear in their minds as to the points which will be made by the other side, and be ready to meet them, remembering that the first half-crown most likely makes five years' business safe.

The Budget

THOUGH, in view of the heavy demands of the National Defence programme of the Government, most people, like ourselves, had no doubt made up their minds that little amelioration of existing burdens was to be expected from last week's Budget, in all probability still fewer persons had anticipated such additions as the Chancellor of the Exchequer in due course announced. There were, it is true, a number who, at the very last moment, backed most exact views by placing orders at Lloyd's for insurances against increases in the precise directions that the Chancellor later in the day stated in the House of Commons that he had selected for the purpose of securing additional revenue. But as the action of these operators is at the moment the subject of inquiry, the argument that the increases were unexpected is not affected.

Many millions will be required to put the country back into the relatively (as compared with other countries) strong position for defence which it was formerly the aim of our statesmen to achieve, and this expenditure must be superimposed upon outlay on social services that not so many years ago would have been regarded as impracticable; but the prevailing cheapness of money had given grounds for the expectation in some quarters that further borrowing might be resorted to as an alternative to increased taxation. However, the Chancellor decided to deal in a strictly normal manner with a somewhat abnormal situation, and having so decided little fault is to be found with the sources selected to provide his additional revenue. The standard rate of income-tax is raised by 3d. to 4s. 9d. in the pound, but, on the other hand, increased married persons and children's allowances benefit the small man to an extent which will in many cases leave him a gainer by the Budget. Apart from this, the Customs duty on tea is raised from 4d. to 6d. per pound—an addition which, on to-day's tea consumption, will cost the average citizen three-halfpence a month, and can hardly sustain the criticism of an unjust burden on the poor which has been levelled against it. Further revenue is anticipated from "closing loopholes in the law," and an additional substantial sum is to be taken from the Road Fund.

This time, at any rate, there can be no complaint of one industry being penalized while another escapes (for tea is so universally drunk as to be in a class by itself). All industries alike will be affected by the higher income-tax, which it must be hoped will do nothing to put the brake on the movement towards greater prosperity which of late we have all been noting with intense gratification. One cannot help wondering, however, whether this year's Budget has not brought an "Economy Government" appreciably nearer. In the meantime, it is satisfactory to note that there is a scheme on foot to be known as Special Areas Development, and also that the Key Industries Duties, imposed in 1921 under the Safeguarding of Industries Act, are to be continued for a further period of ten years.

Income Tax Research

WHILE, therefore, the Budget this year offers for comment no proposals of direct and particular moment to the Gas Industry it may not be out of place at this juncture to call attention to what amounts, in many spheres of industry, to a perennial grievance—the state of the law as regards income-tax on research expenditure. The regulations have long been regarded by many people as unsatisfactory, and representations have, we believe, been made to the Chancellor in previous years upon the subject. There has been no uniformity in the procedure adopted by Inspectors, and the position, it is claimed, needs clarification. The most that anyone in the tax office appears willing to consider is that there should be a rebate on money contributed to a research association,

and presumably any monies contributed to the research work of The Institution of Gas Engineers would not come under this heading.

It is strange that Governments so far have not proved more willing to make concessions to those firms who engage in research work. We can understand that it would be a matter of some difficulty to allow rebate on all money expended on research, as there would arise the difficulty of deciding what is and what is not research, but at least a reasonable compromise could be made. The Report of the Department of Scientific and Industrial Research for last year contained an urgent plea that British manufacturers should undertake more Research work. The Government has agreed to contribute more money for Research, and Lord Rutherford in his report urged manufacturers to consider that now is the psychological moment to increase their research expenditure. Through a number of fortunate circumstances we have made more progress industrially than our foreign competitors. As Lord Rutherford puts it: "We are in a position to-day to report evidences of a forward movement, and not only in the industries covered by our Research Associations. It is of the first importance that this movement should continue to be pressed forward without delay. This is not a case in which time is on our side. The fact that this country has succeeded better than some others in raising herself by her own efforts from the economic depression which has affected the whole world gives her, momentarily perhaps, an opportunity of recovering some of the industrial supremacy she enjoyed until the Great War. If the opportunity is to be seized it will require an intensive application of scientific methods to all those industries which are made possible by our natural resources, our economic situation, and the skill and enterprise of our people."

Brave words! But they do not only suggest that manufacturing firms should join the Research Associations. In many respects private research is equally important, and should be given equal consideration when taxes are to be collected. Research is unlike any other form of industrial expenditure. It may be successful beyond dreams; it may result in nothing save a debit item on the annual balance sheet. If it fails, the firm pays. If it succeeds, the country as a whole benefits by the advances that have been made. If, by research, the Gas Industry improves either its service or its products, or if it is enabled to sell gas a little cheaper, who benefits? Not the shareholders to any considerable extent, but primarily the industries and people of the country who use gas. A very sound case could be made out for income tax rebate on the whole genuine research expenditure of the Gas Industry, and we hope that one day it may be possible to convince a Chancellor that those who have the initiative to undertake investigational work should be encouraged.

Engineers, Managers, and Salesmen

THE years since the War have seen a progressive shift in industrial emphasis from the technical men to the salesmen. Before the War, this country had no particular difficulty in selling its products, so that most manufacturing concerns put the emphasis upon the excellence of their technical staffs whose only endeavour was to produce better and still better goods, and if possible at less cost. There is, perhaps, something to be said for the view that excellence of technical production in many lines of business has reached so high a pitch that the stress formerly laid upon the manufacturing side is no longer necessary. Nevertheless, those industries which have continued to concentrate upon manufacture—while not neglecting salesmanship—have in many instances gone still farther ahead. An example of this is the rayon industry, which, as Mr. A. B. Shearer told the Society of Chemical Industry recently, has within the last fifteen years multiplied its output twenty-fold, and at the same time by steady improvement, without any spectacular discoveries, has reduced the price during the last ten years from 12s. 6d. to 2s. 6d. a lb. Concurrently with this there have been quite astonishing improvements in the quality of the product into the details of which it is not necessary to enter here.

This, it may be said, has nothing to do with gas; but the policy and achievements of the rayon industry are worth noting as an example of what can be done by a balanced combination of technical progress with sound salesmanship. The disposition to-day in many Industries is to concentrate upon the sales side on the principle that it is of no use making a thing if you cannot sell it. American selling methods have been imported into this country, and with the importation the opinion of the salesmen of their own importance has risen. We do not refer specifically to the Gas Industry, but to salesmen in general. For years the trade and daily Press has been full of sales articles, sales ideas, and so forth. Salesmen, by the nature of their calling, are not backward in coming forward, and, riding upon the tide of success, they have, quite rightly, consolidated their position. It is a fact that for years this country has neglected salesmanship and it has needed a warning from the Highest Quarters to rectify the position. To-day, every industry pushes out its salesmen, like scouts before the main body, to bring in tidings of what is being done elsewhere, and, like skirmishers, to prepare the way for advances.

Dr. E. F. Armstrong, noting the present emphasis placed upon salesmanship, not long ago asked if we are not putting too much store by selling and too little by manufacturing. No one would suggest any slackening of sales efforts, but the question may be asked whether industry in general is preserving the necessary balance. In asking this question we do not suggest that the answer is necessarily in the negative. In our own Industry certainly the reversal of the old order is far from having reached dangerous proportions. The greatest efforts are necessary to preserve and extend the business of the Gas Industry, and there is little fear at present of any lack of effort to back up the salesman by maintaining the solid foundation upon which success has been built, namely, a system of gas manufacture that shall embody the latest technical advances, in conjunction with plant of the most efficient type that modern engineering and chemical skill can devise. In the larger undertakings no difficulty is likely to arise, since the sales staff and the manufacturing staff are frequently under separate management. In the smaller undertaking the same individual generally functions as engineer and manager, which means that he is in control of every section of its activities. But the manufacturing and the commercial sides are even more interdependent in our Industry than in most, and the ideal cannot possibly be either that an engineer shall be responsible for the sales side or that a commercial man, with no knowledge of gas manufacture, shall control the works. So that the thought for us arising from Dr. Armstrong's question is that the trained and skilled sales manager is becoming more and more indispensable to every gas undertaking in these testing days, and that those who have hitherto considered themselves too small will do well to think again.

In any case, the selling of gas is not like the sale of chocolates over a counter, and, whether or not it is true that the gas manager of the future must understand the principles and practice of salesmanship, it is clearly recognized that the gas salesman in the industrial gas

market must be a highly trained technician. The Industry as a whole has not yet made up its mind to this extent concerning the domestic field, but there is little doubt that the householder is becoming increasingly capable of appreciating information and argument about the relative merits of gas and competing fuels.

A Friend Passes

THE passing of the Hotel Metropole from London's list of meeting places is worthy, we believe, of brief comment in these columns, if only because Gas Industry affairs which have been discussed there on innumerable occasions have provided us with " copy " for many a column. The announcement of the thirty-first Annual General Meeting and of the Annual Dinner, on May 13, of the Society of British Gas Industries, first really brought home to us the fact that the somewhat sudden closing of the Metropole will cause many of us in the Industry something of a wrench, and, when we have formed a habit of a considerable number of years, it will require at the very least some effort of memory to re-direct our steps to the new venue—the May Fair Hotel, Berkeley Street, W. 1—to hear the deliberations, and enjoy the hospitality, of the Society next month.

Hard on the heels of this invitation came the announcement that the National Gas Council, also, is to hold its Annual Meeting at the May Fair, and it appears likely that we shall have to trek, on many occasions in the year, further West from our humble City offices than we have done in the past. *De mortuis nil nisi bonum;* and perhaps after all it was only professional jealousy which, in the past, attributed a certain stuffiness in the atmosphere of the customary meeting room to the impossibility of adequate ventilation with the existing method of lighting. At least it can be said of the Metropole that it was loyal to the system of its choice, and we can recollect no single instance of its giving to a gas meeting the crowning joy of an electrical black-out. In any future competition for Gas Industry business we freely offer to the great hotels of the Metropolis this helpful suggestion for winning popularity by providing first-class propaganda material. In the strictest confidence we might even impart a list of speakers, who, in the general view of the Industry, could well be given this even stronger hint than the famous red light of the Institution Secretary.

PERSONAL

Retirement of Mr. T. B. James

Over half a century with the Gloucester Gas Light Company is the record of Mr. T. B. James, who has retired from the position of Secretary.

Mr. James completed 43 years in the office of the Company and 16 years as Secretary, and his loyal services throughout that period were suitably rewarded at a meeting of the Directors, each of whom paid very warm tributes to the work he had rendered.

The presentation took the form of a silver salver, and the meeting was presided over by Major Julian Day, who spoke in enthusiastic terms of Mr. James's service so far as he had been connected with him, and asked Mr. J. H. Jones, the late Chairman of the Company, who had been associated with Mr. James since 1887, to make the presentation.

Handing the salver to Mr. James, Mr. Jones expressed the regret of the Directors that the time had come for his retirement, and wished him all health and happiness in the future. He spoke in the highest terms of his knowledge of him as an officer of the Company, and also as a personal friend.

Mr. James, in accepting the gift, thanked the Chairman and the Directors for their kindness and consideration and gave interesting details regarding the progress of the Company since he had entered its service. The Company was, he said, incorporated in 1820, and on April 6, 1877, he entered the offices as office boy at the age of 16 to Mr. George Vinson, the then Secretary, upon the recommendation of the late Mr. Samuel Bowly, the Chairman of the Company. The number of consumers for that year was 2,440 and the quantity of gas sold was about 80 million cu.ft. After 43 years in the office he was appointed Secretary to succeed Mr. W. E. Vinson, being the fourth person to hold that position. In addition to the secretarial duties, he was also responsible for and the control of the distribution department, and for the sale of coke, tar, and sulphate of ammonia. For 1920 the number of consumers was 12,214 and the amount of gas sold was 444,210,000 cu.ft. By the end of 1935 the consumers totalled 17,969 and the quantity of gas 584,064,000 cu.ft. He maintained, in conclusion, that the wonderful success and prosperity of the Company had been due to the wisdom and foresight of the Directors in the past, and he hoped that it would be continued and upheld by the present Board in the future.

Upon the invitation of Mr. James, 60 members of the Staff and Distribution Department were subsequently entertained at the Midland and Royal Hotel.

Mr. J. H. Jones and Mr. Morgan Matthews (Directors) attended, together with Mr. F. W. Rogers, who is Mr. James' successor, and Mr. W. A. Chard, the newly appointed Distribution Manager.

During the evening Mr. W. D. Palmer, on behalf of the Staff and Distribution Department, presented a clock to Mr. James as a mark of esteem and appreciation of his kindness to them during the many years he had been connected with them.

Mr. James thanked the donors for their gift, which he and his family would cherish and which would bring back to his memory very pleasant recollections of his association with them.

Mr. Jones and Mr. Morgan Matthews also spoke in very appreciative terms of Mr. James' work for and great interest in the Company in all respects and wished him and his wife and family many years of health and happiness in his retirement.

A record of over thirty years' service with prominent groups of gas companies having interests all over England is possessed by Mr. FRANK WILLIAM ROGERS, who succeeds Mr. T. B. James as Secretary of the Gloucester Gas Light Company.

Last September Mr. Rogers took up an appointment with the Severn Valley Gas Corporation, who control the Gloucester Gas Light Company, as travelling gas accountant. Since 1903 he had been employed as gas accountant in the London office of Messrs. Anderson Brothers, who controlled a number of gas companies in England and Ireland. He retired from this firm when the partnership was dissolved, securing the post with the Severn Valley a day or two later.

On the death in Gloucester of Mr. W. H. Badham, and the illness of Mr. James, Mr. Rogers was sent to the city, and the Gas Corporation esteemed his services so highly that on his third day in Gloucester he was appointed to the joint office of Accountant and Assistant Secretary.

Later he was promoted Secretary to the Gloucester Company, the appointment took effect on March 31, on which day Mr. James retired.

Born in the North of England, Mr. Rogers was trained in gas finance under the Kendal (Westmorland) Corporation, leaving there to serve with the Merthyr Tydfil Gas Company, where he was Head Clerk and Cashier, and later Collector and Assistant Secretary. When he left Merthyr Tydfil, Mr. Rogers was employed by Messrs. R. Bruce and G. William Anderson as gas accountant, where he served for 32 years.

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The wedding of Mr. W. P. SMITH, B.Sc., Engineer and Manager of the Fleetwood Gas Company, and Miss Helen

Evelyn Rogerson, M.B., Ch.B., M.R.C.S., L.R.C.P., was solemnized at Bispham Parish Church on April 22 by the Bishop of Hulme, assisted by the Vicar of Bispham. Mr. Smith is the only son of Mr. W. J. Smith, B.Sc., Engineer and Manager to the Bolton Corporation Gas Department. Dr. Rogerson is the elder daughter of the late Mr. Wm. Rogerson, who was formerly Gas Engineer at Middleton and Chairman and Managing Director of the Fleetwood Gas Company and a Director of the Kirkham Gas Company.

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At the Annual General Meeting of the Federation of British Industries on April 22, Lord HIRST OF WITTON was elected President for the coming year. Lord Hirst has always been closely identified with the electrical industry, commencing his career in that sphere at the age of 18. He was one of the founders of the General Electric Company, becoming Managing Director in 1900 and Chairman in 1910.

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In succession to the late Alderman Robert Henderson Hume, M.A., whose tragic death was announced in the "JOURNAL" for Feb. 5, we learn that Councillor ALLAN STEWART GILES has been elected to the Chairmanship of the Birmingham Gas Committee.

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Mr. S. TOMLINSON JONES, Assoc.Inst.Gas E., Technical Assistant to the Colwyn Bay Corporation Gas Department, has been appointed as Technical Assistant to the Falkirk Corporation Gas Department, and will commence his new duties on May 18.

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Mr. S. E. WHITEHEAD, B.Sc., M.I.Mech.E., has been elected to a seat on the Board of the Southampton Gaslight and Coke Company, in succession to Col. Sir EDWIN K. PERKINS, C.B.E., D.L., J.P., who has felt it necessary to retire owing to the state of his health. Mr. Whitehead will retain the position of Engineer and General Manager, which he has held for the past four years, having been previously, for two years, Engineer to the Company.

The Directors and the whole of the staff of the Southampton Gas Company deeply regret the retirement of Sir Edwin Perkins, who had been a Director for 15 years, for eight of which he was Deputy Chairman.

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Many friends of Councillor JOHN ROBINSON, who for almost half a century was actively associated with the Altrincham Gas Company, will be pleased to hear of his recent appointment as Chairman of the Altrincham Urban District Council. Since ceasing to take an active interest in the Gas Company some seven years ago, Mr. Robinson has served in various capacities on the local Council, and it seems a fitting tribute that his interest and work should culminate in his latest appointment. For a number of years Mr. Robinson served on the Committee of the Lancashire Gas Salesmen's Circle. He was Hon. Treasurer and Secretary of the Manchester and District Junior Gas Association, a Past-President of the Altrincham Chamber of Trade, and Chairman and Secretary of the Altrincham Hospital Silver Fund Committee.

Obituary

Mr. HENRY LAWTON, of Morecambe, died on April 18 at the age of 71. As a young man Mr. Lawton was employed as Gas and Water Engineer at Carnforth for over 9 years, after having held a similar position at Milnthorpe. He left Carnforth to take up an appointment with the Airedale Undertaking, from which he retired five years ago after working there about 30 years.

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Mr. WILLIAM HEYWOOD, formerly Secretary of the Wrexham Gas Company, died last week at the age of 75. He had been in the service of the Gas Company from 1879 until 1920, when he retired on superannuation after 22 years' work as Secretary.

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On Wednesday, April 22, the death occurred after a short illness of Mr. JOHN LANG, Engineer and General Manager of the Vale of Leven Gas Company. A native of Dumbarton, he was trained in the local Gas-Works and afterwards became Assistant to the late Mr. James McGilchrist. In 1903 Mr. Lang was appointed Manager of the Fraserburgh Gas Company, which Undertaking he developed and conducted with great ability for nearly five years. In 1908 he removed to Alexandria, and his return to the West of Scotland synchronized with the beginning of his life work, which was the success and prosperity of the Vale of Leven undertaking. These remain a tribute to Mr. Lang's ability as a Gas Engineer and acumen as an Administrator.

He joined the North British Association of Gas Managers as an Associate Member in 1897 and was transferred to Membership Class in 1904. He was President in 1917 and carried out the duties of that office with a dignity and charm which won the approval of his colleagues. In later years Mr. Lang continued to serve the Industry as a member of the Scottish Executive Committees of the National Gas Council, the British Commercial Gas Association, and the Federation of Gas Employers. He was a regular attender at the annual meetings of The Institution of Gas Engineers, which he joined in 1901.

Forthcoming Engagements

May.

1.—GAS COMPANIES' PROTECTION ASSOCIATION.—Committee Meeting, 2.30 p.m.
1.—I.G.E.—Liquor Effluents and Ammonia Committee, 11.15 a.m.; Joint Research Committee, 2.30 p.m.
1.—LONDON AND SOUTHERN JUNIOR ASSOCIATION.—Annual Business Meeting.
5.—I.G.E.—Research Executive Committee, 2.30 p.m.
6.—MANCHESTER JUNIOR ASSOCIATION.—Visit to Parsonage Pit and Washeries of the Wigan Coal Corporation, Ltd., West Leigh, followed by meeting and general debate.
6-7.—EASTERN COUNTIES GAS MANAGERS' ASSOCIATION.—Spring Meeting at Lincoln.
7.—SOUTHERN ASSOCIATION OF GAS ENGINEERS AND MANAGERS (EASTERN DISTRICT).—Discussion Meeting, 28, Grosvenor Gardens, S.W. 1.
7.—MIDLAND ASSOCIATION OF GAS ENGINEERS AND MANAGERS.—Spring Meeting at Northampton.
7.—MIDLAND JUNIOR ASSOCIATION.—Annual General Meeting. Address by Mr. E. W. Smith.
8.—NORTH OF ENGLAND G.M.A.—Annual Meeting at Newcastle and Lecture by Prof. J. W. Cobb, C.B.E.
9.—SCOTTISH EASTERN JUNIOR ASSOCIATION.—Annual General Meeting.
12.—N.G.C.—Annual General Meeting, May Fair Hotel, London, 2.30 p.m., preceded by Luncheon.
13.—S.B.G.I.—Council Meeting, 11.30 a.m.
13.—S.B.G.I.—Annual General Meeting, May Fair Hotel, London, W. 1, 2.45 p.m.
13.—YORKSHIRE JUNIOR ASSOCIATION.—Meeting at Leeds with Salesmen's Circle.
19.—I.G.E.—Gas Education Executive Committee, 2.30 p.m.
20.—B.C.G.A.—Executive Committee Meeting, 11.30 a.m.; General Committee Meeting, 2.30 p.m.
21.—WALES AND MONMOUTHSHIRE ASSOCIATION OF GAS ENGINEERS AND MANAGERS.—General Meeting at Monmouth.
26-29.—I.G.E.—Annual General Meeting.

June.

8.—I.G.E.—Finance Committee, 1.45 p.m.; Membership Committee, 2.15 p.m.; General Purposes Committee, 3 p.m.
9.—I.G.E.—Council Meeting, 10 a.m.
10.—ASSOCIATION OF STATUTORY INSPECTORS OF GAS METERS.—17th Annual General Meeting, County Hall, Westminster, 10.15 a.m.
16.—I.G.E.—Gas Education Executive Committee, 2.30 p.m.
18.—I.G.E.—Refractory Materials Joint Committee (Stoke-on-Trent), 2.30 p.m.
19.—WAVERLEY ASSOCIATION OF GAS MANAGERS.—Annual Meeting at Edinburgh.
23.—I.G.E.—Gas Education Consultative Committee, 2.30 p.m.
24.—I.G.E.—Board of Examiners (Oral Examinations), 9.30 a.m.
30.—SOUTHERN ASSOCIATION.—Annual Summer Meeting.

July.

3.—MANCHESTER DISTRICT ASSOCIATION.—Manchester Meeting.
8-10.—CANADIAN GAS ASSOCIATION AND NORTH-WEST CONFERENCE PACIFIC COAST GAS ASSOCIATION.—29th Annual Convention, Vancouver.
24.—SOUTHERN ASSOCIATION OF GAS ENGINEERS AND MANAGERS (EASTERN DISTRICT).—County Meeting at Swindon.

News in Brief

An Exhibition of gas appliances was held by the Millport Gas Department last week. Cookery lectures were given by Miss Lee Brooker, and large audiences attended.

For Showrooms at Potters Bar the Directors of the Barnet District Gas and Water Company have accepted the designs of Mr. Kenneth Dalgliesh, F.R.I.B.A., of Temple Chambers, Temple Avenue, E.C. 4.

A Series of Afternoon Cookery Lectures are being held by the Leamington Priors Gas Company from April 28 to May 8 in the showrooms, Regent Street. The lectures will be given by Miss M. Harris, N.S.T.C., M.C.A.

The Eighteenth Annual General Meeting of the National Gas Council of Great Britain and Ireland will be held at the May Fair Hotel, Berkeley Street, Piccadilly, W. 1, on Tuesday, May 12, at 2.30 p.m. The meeting will be preceded by luncheon at the same Hotel.

At the Grocers' Exhibition Manchester Corporation Gas Department are showing all-porcelain enamel cookers, washboilers, washing machines, water heating appliances for the home and shop. Of special appeal to shopkeepers and café and supper bar proprietors is the range of commercial equipment.

Dividend Income-Tax Tables for the use of secretaries, bankers, accountants, &c., No. 25 for deduction at 4s. 9d. in the pound, reached us last week—yet another tribute to the enterprise of Messrs. Fredc. C. Mathieson & Sons, 16, Copthall Avenue, E.C. 2, from whom the tables are obtainable at one shilling.

The Association of Statutory Inspectors of Gas Meters are holding their 17th Annual General Meeting at the County Hall, Westminster (by kind permission of the London County Council), on Wednesday, June 10, next. The Chair will be taken by the President (Alderman W. O. Wills, of Exeter) at 10.15 a.m.

Bedford District Gas Company.—On behalf of the Directors of this Company Messrs. A. & W. Richards, of 37, Walbrook, E.C. 4, are offering for sale by tender £20,000 of 4% perpetual debenture stock at a minimum price of issue of £103%, yielding at that price £3 17s. 8d.%. Tenders must be received not later than 11 a.m. on Tuesday, May 5, next.

A Gas Meter Testing Station is proposed to be set up at Blackpool to obviate the sending of meters to Manchester or Burnley. It is expected that 4,500 meters will be dealt with in the first year, of which over 1,000 will be submitted by the Corporation. The station is expected to be erected within two months and will occupy premises in Back Victory Road.

The Increasing Consumption of gas at Aberdeen was further evidenced by the report of the Department for the month of March which stated that the amount of coal carbonized increased by 379 tons as compared with March, 1935, while the quantity of gas made was 9,168,000 cu.ft. greater. Revenue from coke increased by £306 and from tar products and ammoniacal liquor by £221.

The 31st Annual General Meeting of the Society of British Gas Industries will be held at the May Fair Hotel, Berkeley Street, W. 1, on Wednesday, May 13, at 2.45 p.m. Sir John Cadman will deliver his Presidential Address, entitled "Great Britain and the Oil Industry." Members' attention is particularly directed to the fact that the meeting is *not* being held at the Hotel Metropole as in previous years.

Application for a Special Order under the Gas Undertakings Acts, 1920 to 1934, is intended to be made to the Board of Trade by the Taunton Gas Light and Coke Company with the object *inter alia* of transferring to and vesting in the Company the undertakings of the Ilminster Gas Light, Coal, and Coke Company, the Milverton Lighting Association, and the Wiveliscombe Gas Light and Coke Company.

The Spring Meeting of the Midland Association of Gas Engineers and Managers will be held at Northampton on Thursday, May 7, when members will have the opportunity of inspecting the Works of their President, Col. G. S. Eunson. The visit will be followed by luncheon at the Town Hall on the kind invitation of the Chairman and Directors of the Northampton Gaslight Company. Subsequently visits will be paid to the College of Technology or the Fire Station and New Baths.

The Good Ship "Mr. Therm" was recently launched by Lady Milne-Watson at Messrs. Austin and Son's Sunderland yard. Referring to the "Mr. Therm," Sir David Milne-Watson said it was the biggest collier owned by the Gas Light and Coke Company and would carry coals from the Tyne and Wear to Dagenham. The Company used 3 million tons of coal annually, most of which was mined in County Durham.

The Importance of Domestic Refrigeration was stressed by Mr. D. Russell, north-western area Manager for the Electrolux Company, when he addressed a special gathering of inspectors and employees of the Blackburn Corporation Gas Department on April 21. Mr. J. D. Ashworth, Engineer and Manager of the Blackburn Gas Department, proposed a vote of thanks to the lecturer and said his remarks had been most instructive and convincing.

The Acquisition of the whole of Carlow Place, comprising about 1¼ acres, was reported by the Buckhaven and Leven Gas Board at their monthly meeting on April 20. It is proposed to use the land for the erection of a new purifier, a station meter, and a gasholder. Carlow Place consists of 84 houses erected for the miners at Keven Colliery in 1879. Recently some 40 houses were reconstructed, but since these do not conform with modern ideas they will be closed by the Town Council.

A Battery of Gas Ovens is to be constructed by the South Durham Steel and Iron Company, Ltd., and the Cargo Fleet Iron Company at West Hartlepool adjoining their existing furnaces, while two reconstructed furnaces at Seaton Carew are to be restarted after being idle 11 years. The contract for the West Hartlepool ovens has been awarded to Gibbon Bros., of Middlesbrough and Dudley. The surplus gas from the coke ovens and blast furnaces will be used for steel making at the West Hartlepool plate mills. The plant will use 7,500 tons of coal weekly.

An Overwhelming Majority for Gas was the result of a questionnaire to over 150 tenants on Bolton Corporation housing estates asking for their views on gas and electric wash boilers and cookers. As a result the Committee have decided to install gas appliances for heating and cooking in the 300 houses which are being erected at Willows Lane. The lighting will be by electricity. Incidentally the Ministry of Health have just approved the Committee's proposal to proceed with the erection of a further 150 houses at Willows Lane by direct labour, and at a cost not exceeding £47,600.

"Modern Principles of Ventilation and Heating" is the subject of a series of three public lectures which will be given by Dr. T. Bedford on the second, third, and fourth Mondays of May at the London School of Hygiene and Tropical Medicine. The course has been arranged by the National Institute of Industrial Psychology under the Heath Clark bequest. The Earl of Dudley, President of the Institute, will preside at the first lecture on May 11, the subsequent Chairmen being Mr. D. R. Wilson, Chief Inspector of Factories, and Prof. W. W. Jameson. The lectures commence at 5.30 p.m.

A Bulk Supply to Poulton-le-Fylde from the Works of the Blackpool Corporation has been approved by the Gas Committee. The proposal is the outcome of previous negotiations by which it was proposed that Blackpool should take over the Poulton Gas Undertaking. The Poulton supply area covers a very wide district and the proposed arrangement will necessitate the laying of 4,000 yds. of gas mains. The agreement proposed is for a period of seven years, at the end of which time it will come up for revision. It is hoped to begin the necessary work as soon as possible and to start supplying by September of this year.

Mr. Henry Woodall, Chairman of the Tottenham and District Gas Company, will preside at a Conference on Profit-sharing and Co-partnership which the Industrial Co-partnership Association is holding by invitation of the Directors of the Tottenham Gas Company, at Woodall House, 658, Lordship Lane, Wood Green, N. 22, on Tuesday, May 5, at 2.45 for 3 p.m. The speakers will be Mr. F. Gray Healey, a Director of Messrs. Charles Churchill & Co., Ltd., and Mr. J. G. Mathieson, Managing Director of Messrs. Clarke, Nickolls, & Coombs, Ltd., and Mr. F. W. Raffety, Chairman of the Industrial Co-partnership Association.

Amalgamation and Grouping

Severn Valley and Malpas.

The Severn Valley Gas Corporation have now acquired a controlling interest in the Malpas Gas Company.

United Kingdom, Llanelly, and Malton.

The United Kingdom Gas Corporation has recently acquired 94·29% of the original shares of the Malton Gas Company. The Corporation's offer to the shareholders of the Llanelly Gas Light Company has been accepted to date to the extent of over 85%.

Women's Gas Council

Belfast Branch Inaugurated.

The Lady Mayoress (Lady M'Cullagh) presided at the meeting of the Belfast Branch of the Women's Gas Council which was held in the central showrooms of the Corporation Gas Department, Queen Street, Wednesday, April 22, and which was addressed by Miss Halpin.

Lady M'Cullagh has consented to be the first President of this branch and it is hoped that the work of the W.G.C. will shortly be extended to cover several other towns in Northern Ireland.

The Institution of Gas Engineers

Invitation to Mechanical Engineers' Meeting

Members of The Institution of Gas Engineers are invited to attend the undermentioned Meeting of the Institution of Mechanical Engineers, which will be held at Storey's Gate, St. James's Park, S.W. 1. Visitors' tickets for this meeting may be obtained from the Secretary of The Institution of Gas Engineers:

FRIDAY, MAY 8, at 7 p.m.

"Power Transmission by Belts." To be introduced by J. Hornsby. (Informal Meeting.)

Western Junior Gas Association

Annual General Meeting at Plymouth

The Annual Meeting of the Western Junior Gas Association was held in the demonstration room of the Plymouth and Stonehouse Gas Light and Coke Company on April 18, 1936.

The Association was officially welcomed by Mr. P. S. Hoyte, who apologized for the unavoidable absence of the Managing Director, Col. Norrington, C.M.G.

The President, Mr. J. H. Dyde, thanked Mr. Hoyte for coming to welcome the members on behalf of the Board of Directors, and Mr. R. J. H. Clark, who was present in the dual rôle of President of the Southern Association and Hon. Member.

The following officers were elected for the Session 1936-1937:

President.—S. B. Jones (Clevedon).
Senior Vice-President.—J. E. Ackroyd (Swindon, G.W.R.).
Junior Vice-President.—A. Tran (Bath).
Hon. Treasurer.—A. B. Horsfield (Bristol).
Hon. Secretary.—K. L. Clark (Weston-super-Mare).
New Council Members.—Sydney Smith (Bristol), H. D. Sullivan (Plymouth), A. Bell (Exeter).
Hon. Auditors.—John F. Marlow (Weston-super-Mare), H. Randall (Stroud).

All the officers of the Association were thanked for their past services, and especially Mr. B. F. Harris (Trowbridge), who had relinquished the duties of Treasurer after having served for three years. The reports of the Hon. Secretary and Treasurer with the balance-sheet, which had been circulated to all members, were taken as read and adopted.

At the end of the meeting Mr. S. B. Jones took the Chair and called upon Mr. J. H. Dyde to give his Presidential Address, which is commenced on other pages of this "JOURNAL."

A vote of thanks to the President was proppsed by Mr. J. E. Ackroyd, seconded by Mr. A. Tran, and carried unanimously. Mr. J. H. Dyde suitably replied.

The members adjourned to the Royal Hotel, where tea was provided through the courtesy of the Chairman and Directors of the Plymouth and Stonehouse Gas Light and Coke Company. Mr. Sydney Smith proposed a vote of thanks to the Company's Directors.

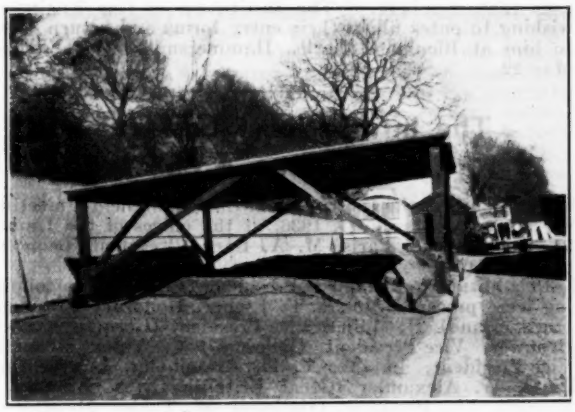
Mr. R. J. H. Clark, Engineer to the Plymouth and Stonehouse Company, in replying, stated that his Directors were always pleased to help the Juniors in any way, and they had been delighted to entertain the Association that day.

Further Improvements at Southminster

Movable Roof for Revivifying Floor

Our readers will doubtless remember the article we published on Nov. 6 last dealing with the improvements which have been effected in the production and supply of gas at the Essex village of Southminster since the Gas Company came under the control of Mr. R. V. E. de B. Crawshay.

We are interested to learn that improvements are still being carried out in various directions, and the accompanying photograph illustrates what must be something of a novelty in gas-works practice.



The New Movable Revivifying Bed Housing.

The oxide revivifying floor is a long one, and there is a large working stock of purifying material necessitated by the small boxes and by the fact that one of them has to have its oxide changed every five days or so. To erect a building to protect the whole revivifying area from the weather would have been somewhat expensive. Therefore the movable housing shown in our photograph was evolved by the Works Manager, Mr. G. James. The roofing is supported at each corner by columns attached to wheels which run on a track laid on concrete on either side of the oxide bed. The whole housing can easily be pushed by one man to any position required, so that the necessary amount of weathering can be regulated to produce the required dryness in the batch of material next to be used.

The work was carried out by a local builder, and the total cost for the whole track and building amounted to £21 10s. The idea may be of interest to other small works.

Holding Companies Active in South Wales

Offer to Neath Reported

From South Wales comes a report of an offer made by a holding company for the Undertaking of the Neath Corporation Gas Department. The source of the offer is not yet divulged.

When the offer was made to the Neath Corporation it was immediately referred to committee.

A local correspondent discloses that the Company first offered £170,000 for the Undertaking. This was eventually increased by £7,000, but the council, sitting in committee, turned the offer down. It is understood, however, that the matter will be reopened at the next meeting. Many ratepayers are convinced that the offer should be accepted.

S.B.G.I. Golfing Circle

Arrangements for Spring Meeting

The S.B.G.I. Golfing Circle is holding its Spring Meeting at Royal Mid-Surrey Golf Club, Richmond, Surrey, on Monday, May 25, and cordially invites golfing members of The Institution of Gas Engineers attending the 73rd Annual General Meeting of the Institution to take part in the competitions on that day.

The programme will be as follows:

During the Day.—18 holes medal play for the "Thornton Victory Cup," with a separate prize for visitors presented by Col. W. Moncrieff Carr, O.B.E., T.D., President, The Institution of Gas Engineers.

Afternoon Only.—18 holes foursomes against bogey for prizes presented by a member of the Circle.

Tee off as soon after 9.30 a.m. as possible. Cards in both competitions are returnable by 6 p.m. An optional sweepstake of 2s. 6d. will be held in conjunction with each competition. The Royal Mid-Surrey Golf Course is conveniently situated, in beautiful surroundings, within a few minutes' walk from Richmond Station, which is served by frequent trains both by District and Southern Railways. Caddies, lunch, and tea will be available at reasonable charges.

The Green fee will be 5s.

The Hon. Secretary and Treasurer, Mr. W. R. Edgar, asks that members of The Institution of Gas Engineers wishing to enter fill in their entry forms and return them to him at Blenheim Works, Hammersmith, W. 6, before May 22.

The International Gas Union

Board Meeting in Paris

The Board of the International Gas Union held a meeting on Saturday, March 14, 1936, at the offices of the Union, 21, rue Blanche, Paris, M. A. Baril, President, being in the Chair.

In addition to M. Baril, President (France), the following were present: Messrs. F. Escher, Honorary President (Switzerland); H. Müller, Vice-President (Germany); J. de Brouwer, Vice-President (Belgium); C. Valon Bennett, Vice-President, and W. T. K. Braunholtz, representing J. R. W. Alexander (Great Britain); G. A. Brender à Brandis, Vice-President (Holland); W. Tobler, Member of the Board (Switzerland); Th. Keclik, Vice-President (Czechoslovakia); Fr. Plenz, Reporter of the Commission appointed to examine the German report; G. Reclus, Reporter of the Commission appointed to examine the French report; and P. Mougin, General Secretary.

The Board confirmed the decisions made at the meeting held on May 4, 1935, in Paris, as well as the proposals made by the Bureau, which met in Brussels on Oct. 15, 1935.

After clearing up a certain number of administrative questions, the Board heard the report of the work of the International Commissions, which met on March 12 and 13, in Paris, to continue the examination of the following questions:

"Co-ordination of the Methods of Testing and Guaranteeing Gas Making Plants," report by the German Association (Commission presided over by Dr. H. Müller, of Dessau);

"Co-ordination of Methods of Testing Gas Appliances," report by the French Association (Commission presided over by M. M. Lebon, of Paris);

"Methods for Establishing Tariffs" (Commission presided over by Herr F. Escher, of Zürich).

This latter Commission proposed to the Board that a *Vocabulary of the Gas Industry* should be prepared. Designed in the first place to deal with expressions regarding tariffs, this vocabulary would be extended to cover all the technical expressions in everyday use in the Gas Industry; it would be drawn up in the three official languages of the International Gas Union (German-English-French), but translations into other languages could also be added to this lexicon.

The Board accepted this proposal, and the Commission will carry out the preparation of this vocabulary, along the lines indicated.

The Commission entrusted with the "Systems of Carcassing Buildings," Swiss Association's report (Commission presided over by M. M. Thoma, of Basle), had not met; it will hold its meeting as soon as it has received from the National Associations the whole of the data that are indispensable.

The President referred to the general lines of the organization of the Third International Gas Industry Congress, which remained fixed for June 14 to 20, 1937, in Paris. In addition to the questions that are being examined by the Commissions, the programme of this Congress will include two new questions: that of the "Destruction of Gas Piping by Electrolysis" (Reporter: Great Britain), that of the "Materials Used for Piping" (Reporter: Italy), and one or two conferences.

The President then read a letter of invitation to attend the Chemical Engineering Congress of the World Power Conference, which will be held in London, from June 22 to 27. The Board gave full power to its President, M. Baril, to represent the International Gas Union officially at this Congress.

The Board decided to hold its next meeting on Monday, June 22, 1936, in London.

Industrial and Commercial Management

Polytechnic Studd Lectures

Members of The Institution of Gas Engineers are invited by the Governors of the Polytechnic, Regent Street, London, to attend the following series of Studd Lectures on Industrial and Commercial Management arranged by the Department of Industrial Administration, which will be given in the Fyvie Hall of the Polytechnic from 6.30 to 7.30 p.m. on the Fridays indicated:

LECTURE 1—MAY 1, 1936.

Prof. Arnold Plant, B.Sc.(Econ.), B.Com., Sir Ernest Cassel Professor of Commerce, University of London, on "Some General Aspects of Distribution Under Modern Economic Conditions."

LECTURE 2—MAY 8, 1936.

Mr. Hugh Weeks, M.A, Research Manager, Cadbury Bros., Ltd., on "Market Research and Production in Relation to Distribution."

LECTURE 3—MAY 15, 1936.

Mr. E. R. Walker, Merchandise Controller, Boots, Ltd., on "Wholesale and Retail Distribution."

LECTURE 4—MAY 22, 1936.

Mr. Ashton Davies, Chief Commercial Manager of the L.M.S. Railway, on "Transport Problems Affecting Distribution."

Admission is by ticket only, for which application should be made to the Secretary, The Institution of Gas Engineers, 28, Grosvenor Gardens, S.W. 1.

Gas Exhibition at Reading

Large Crowds at Town Hall Displays

A most comprehensive exhibition of the use of gas and gas appliances in the household was staged at the Reading Town Hall last week by the Reading Gas Company. Every phase of the domestic use of gas, from boiling to refrigeration, was illustrated. Chief among the attractions were a series of cooking demonstrations which took place twice daily, and were given by Miss Baker, of the Radiation Research kitchen. These demonstrations were attended by record crowds.

The various uses to which gas may be put in the home were amply illustrated. Various types of cookers were on view, including a fine display of large scale cookers for hotel purposes, in the Small Town Hall. Many types of gas fire were shown, all in attractive colours. Among the most admired were panel type fires, with marble surrounds to fit flush with the wall.

Among the displays was a complete bathroom and also a kitchen.

Tea and coffee were served free daily by Messrs. Lyons. The exhibition concluded on Saturday, when at the concluding session a cake baking competition was judged and prizes awarded. For this competition 209 cakes were entered. The total attendances at the cookery demonstrations were 4,650.

An Opportunity for Gas Undertakings.

The opening ceremony was to have been performed by Sir Francis Goodenough, but, owing to illness, he was prevented from attending. His place was taken by Sir Percy Alden, Chairman of the British Institute of Social Service, and an authority on housing matters. Dr. M. W. Coleman (Chairman of Directors of the Reading Gas Company) presided, and was supported by Mr. D. H. Helps (Engineer and Manager) and Mr. A. B. Stedman (Secretary).

The Chairman, in introducing Sir Percy Alden, expressed the hope that the public of Reading would find the exhibition instructive.

Sir Percy Alden spoke principally on the housing problem with which the country had been faced for the past few

years. Those who were interested in the manufacture of gas and gas appliances had an opportunity here. They were doing splendid research work, and had brought into the homes of the poor comforts and amenities which they had previously lacked. Wherever he went he saw a constantly increasing demand for these things, which meant so much comfort and so much happiness. Gas had very great advantages; it was so easily handled, so efficient, and so economical. He had been in many rural districts where the people could not afford to pay for the installation and cost of electricity, and he did suggest that the time might come when the gas companies would supply these districts by way of gas filled cylinders, so that the country areas would be able to have the comforts of gas heating, lighting, and cooking. The old-fashioned coal range was injurious to health and wasteful, and he was convinced that they would have to give up these old-fashioned methods. After all, what was the use of science if they did not utilize scientific discoveries? Gas undertakings were trying to serve the interests of the public because they realized that in doing so they were serving themselves.

A vote of thanks was accorded Sir Percy, on the proposition of Mr. A. H. Sherwood (Deputy-Chairman).

Introducing Wolverhampton

Recognition of Gas Service

These hectic days have compelled even our great cities to resort to publicity campaigns backed by industrial development associations, and among recent entries to the lists is Wolverhampton which is introduced, if any introduction be needed, to the world by the "Book of Wolverhampton."

Of exceptional interest to the industrialist and wayfaring layman alike, this publication should be the cause of many deserved tributes and sincere congratulations to the Wolverhampton Industrial Development Association. And not only should these congratulations be extended for the tasteful presentation of many arresting facts but on the artistic merit of the publication.

Particularly gratifying is the recognition of the progressive spirit of the Wolverhampton Gas Company. "The organization of the Wolverhampton Gas Company's supply of gas from retort to their consumers' meters represents the very last word in progress and efficiency." The Company have a very considerable industrial load amounting to roughly 25% of their total sales and attention is drawn to the much reduced charges for industrial gas.

Institution of Engineers-in-Charge

Annual Dinner

"We are all engaged upon the solution of problems for the benefit of humanity," said Mr. J. M. Kennedy (the President of the Institution of Electrical Engineers). He was replying to the toast of "Our Guests and Friends," which had been submitted by Mr. T. Cooper last Friday, at the Thirty-Sixth Annual Dinner of the Institution of Engineers-in-Charge.

Members and guests to the number of about 250 were assembled in the King's Hall of the Holborn Restaurant, under the Presidency of Mr. E. A. Sandford Fawcett, C.B., and, as is customary at the dinners of this Institution, there was a distinguished top table. The guests for whom seats were allotted there included Mr. Stephen Lacey, Controller, Sales Department, Gas Light and Coke Company; Dr. F. M. Taylor, Principal, Research Laboratories, Gas Light and Coke Company; Mr. Albert W. Beuttell, President, Illuminating Engineering Society; Mr. A. B. Potterton, President, Institution of Heating and Ventilating Engineers; and Dr. H. Levinstein, President, Institution of Chemical Engineers.

The principal toast was "Transport and Its Progress," which was submitted by Mr. D. A. Bremner, Director, British Engineers' Association, who, after paying tribute to the powers of invention which have so enormously improved the methods of transport in a comparatively few years, suggested that the time had come when engineers should begin to survey the position in an aspect which has been too much neglected in the past. It was, he said, time to consider where all this progress was leading to. The facts were astounding. Was it realized that, of all the casualties which occur in the whole of the industries of the country, mechanical transport on roads accounts for no less than 86·5% of the fatalities, while taking fatal and non-fatal accidents together the roads are responsible for 60%? Engineers could not reconcile it with their consciences to sit down under such a state of affairs, and something would have to be done.

The response was made by Sir Charles H. Bressey, C.B., C.B.E., Engineer-in-Chief, Survey of Highways Development in Greater London, who pointed out that there are other forms of transport coming along, so that it would be wrong to keep our eyes too much upon the roads.

The President, replying to the toast of "The Institution," remarked that the membership was steadily growing, and had increased by more than a hundred during his two years of office, while the finances and the benevolent fund were in excellent condition. He reminded those present of the good work done by the Hon. Secretary, Captain A. E. Penn, to whose personality and hard work, he said, the success of the Institution was very largely due.

British Standards Institution

Tubing and Connectors for Portable Appliances

The British Standards Institution has recently issued a new British Standard Specification for Flexible Metallic Tubing and Connectors for Portable Gas Appliances. This specification has been prepared primarily from the standpoint of ensuring the availability of an easily distinguishable, sound, and satisfactory tube. Metal screwed ends have been adopted to ensure the maximum safety in use.

The dimensions of the connector ends and tubes have been standardized in order to ensure satisfactory interchangeability and to facilitate connection and interchangeability between the control tap and the appliance. In addition to the mechanical requirements of the assembled tubing, appropriate qualities of rubber have been specified for the connector sleeves and the rubber thread between the coils forming the tubing. Copies of this new Specification No. 669-1936 can be obtained from the Publications Department, British Standards Institution, 28, Victoria Street, S.W. 1, price 2s. 2d., post free.

Morecambe's Showrooms Opened by the Mayor

Attractive Premises

In the presence of a large and influential gathering, the new showrooms of the Morecambe and Heysham Gas Department in Morecambe Street were declared open by the Mayor (Councillor Walter Townsley) on Wednesday, April 22.

The front is very attractive, and the interior gives ample room for a display of the most modern gas appliances, while upstairs there is a well-fitted lecture-room. Formerly for many years the old Council offices, the building has been converted at a cost of £1,800, and is within a few minutes' walk of the promenade in the very centre of the town, making it of convenient access to all parts of the borough.

Those present at the opening included Alderman J. C. Wilson (Chairman of the Gas Committee) and Mrs. Wilson, Alderman J. Snowden, Alderman R. B. Siddle, Alderman T. and Mrs. Waite. Excellent arrangements had been made by the Gas Engineer, Mr. T. W. Barratt, and his staff, and the proceedings were exceedingly interesting.

The opening ceremony took place upstairs, and the Mayor was supported on the flower-decked platform by Alderman J. C. Wilson, Councillor James Robinson (Vice-Chairman of the Gas Committee), and Mrs. Eileen Murphy (Home Service Director, British Commercial Gas Association).

Alderman J. C. Wilson said: "I have now had the pleasure of being the Chairman of the Gas Committee for 15 years, and it is apparent that for some time the Undertaking has been working under very grave difficulties owing to the inadequacy of the accommodation and facilities available for the proper development of our business. To say that showrooms are a shop window of the Gas Industry, while true, is in fact a considerable under-statement. They are more than that. The up-to-date gas showroom is a meeting room for supplier and consumer, where the public can see the appliances which interest it—in actual working order. It is an exhibition of scientific home planning, for it includes model kitchens and so forth, laid out and equipped on labour-saving, cleanly and economic lines, and it is a continuation school where, with the help of skilled demonstrators whom we intend to employ at various periods women can learn how to get the best out of the labour-saving gas appliances and can also add useful recipes to their cookery books."

Alderman Wilson then called upon the Mayor, Councillor Townsley, to declare the premises open. In doing so the

Mayor said: "It is with very great pleasure that I undertake the duty which has been assigned to me of officially opening these new gas showrooms. These showrooms are an indication of the Gas Committee's intensive progressive policy to do business in spite of competition."

Mrs. Murphy, in the course of a very interesting Address enlivened with some humour, said: "To my mind, the Gas Department has a lot to do with the attractions of Morecambe. In the course of my work I've been to all the great holiday places in England, and I've found that wherever there's a popular seaside place, there's a flourishing gas department as well."

Councillor J. Robinson moved a vote of thanks to the Mayor and Mayoress and Mrs. Murphy, and Mr. Barratt, in seconding, thanked the Gas Committee and the Council for providing the showrooms, and assured everybody that it would be the constant endeavour of the Gas Department to be of real service at all times.

The Mayor returned thanks, and refreshments were served and the showrooms inspected.

Science Display in Glasgow

Gas Department Well Represented

The greatest exhibition of its kind ever held in Scotland was assembled in the Royal Technical College, Glasgow—claimed to be the biggest engineering school in Britain—on April 24 and 25. Mr. J. W. Peck, C.B., M.A., Secretary of the Scottish Education Department, emphasized the important part which science played in the development of industry when he opened the exhibition.

More than 1,000 demonstrators explained the remarkable range of scientific marvels. The Gas Industry was well represented. There were models of the plant used for the manufacture of gas and its numerous industrial applications. The Glasgow Corporation Gas Department were responsible for a display of cookers, fires, and heaters.

The varied exhibits included hydrogenation and distillation plant, sugar manufacturing machinery, cotton looms, knitting machinery, models of colliery plant, radio and television apparatus, experiments on air-craft control, watch-making, baking, glass-blowing, and many illustrations of the advances of chemistry, physics, botany, geology, metallurgy, mining, mechanical, and electrical engineering.

"Specification"—1936 Edition

By Critic

In its modern form "Specification" (The Architectural Press, 9, Queen Anne's Gate, London; price 10s. 6d.) should find a wide circle of readers in the Gas Industry. The policy of the Editor is to include concise information (tabulated where possible) concerning building methods and materials rather than long detailed articles, and for this reason "Specification" has recently obtained an enhanced value for those connected with the Gas Industry.

Several sections have been entirely re-written. Among these are: Excavation, Demolition, Foundations, Piling, Ironmonger, Heating and Ventilating Engineer, Lighting Engineer, Electrical Engineer, and Water Purification.

Twenty-seven trade divisions, from Acoustics to Tiling, are dealt with in a most interesting and informative fashion, while the special articles cover the following important subjects: Industrialized Building, Swimming Pools, Metal Windows, and the Construction of Covered Sports Courts. In the article on Swimming Pools no mention is made of gas lighting, but an example of thermostatically controlled gas fired water heating equipment is quoted.

A most comprehensive treatise on proprietary piling systems, which should have a wide appeal, is included under the heading of "Foundations." The "Reinforced Concrete" section will also repay close study. In the "Metal Worker" Section novel pressed steel door-frames and stairs are set forth; further on, details are given of handy "bicycle-parks" which all modern factories and works can adopt with advantage.

The "Electrical Engineer" division is as usual exceptionally well written, and the Electrical Definitions and Data occupy almost four pages. The "Lighting Engineer" is more or less a continuation of the "Electrical Engineer" division, with a page tacked on at the end devoted to gas lighting. This section is none the less worthy of close study because of the scientific way in which the subject is tackled. Some very interesting paragraphs are devoted to floodlighting, and a useful diagram illustrates the lighting of Big Ben with symmetrical beams.

Under the heading "Heating and Ventilating Engineer" there is a fund of information in respect of modern gas and coke fired apparatus, and this section is well supported by advertisers, who, as is usual in this publication, are encouraged to use their advertising space to set forth information which is useful to the architect and builder.

The new Edition is generally on the same lines as before, but in order to keep abreast of the modern trend of building construction gas engineering students will find it a most useful publication, especially if their library is not graced with the last Edition.

Forshaw's Gas Calculator

Messrs. R. & A. Main, Ltd., inform us that a considerable amount of interest has resulted from the description, in last week's issue, of Forshaw's Gas Calculator, and they ask us to state that the calculator is obtainable from them at the price of one shilling.

Athletic and Social

Metrogas A.O.S. play "Dorothy."

The Metrogas Amateur Operatic Society gave an excellent rendering on Thursday, Friday, and Saturday last week of the favourite musical play "Dorothy."

New Sports Ground at St. Mary Cray

Mr. Benjamin R. Green (Deputy Chairman of the South Suburban Gas Company) formally opened, on April 18, a new pavilion and sports ground having an area of some six acres for the Cray Gas-Works Social Club.

The new sports ground, which is situated in Chislehurst Road, St. Mary Cray, will have provision for football, cricket, and other games for the members of the Club. The pavilion is spacious, and the accommodation includes a tea room, dressing quarters, baths, and a sheltered verandah. The lighting is, of course, provided by up-to-date gas fittings, while all the hot water requirements of the building are served by the same medium in a particularly efficient manner.

Among those accompanying Mr. Green at the opening ceremony were Mr. Harold Gundry (Director of the Company), Mr. H. Weatherley and Mr. C. F. White (Employee Directors), Major J. A. Gould, M.C. (Distributing Engineer), Mr. P. B. Bezant (Engineer, Sevenoaks), Mr. T. Brown (Secretary to the Company), Mr. S. Hollman (Chairman of the South Suburban Gas Amateur Sports Guild), Mr. M. E. J. Ingham (Hon. Secretary to the Guild), Mr. J. A. Rudling (Manager of the Gas-Works, St. Paul's Cray), Mr. H. F. Glass (Local Manager, Orpington), and a large number of the members of the Club.

Mr. Rudling welcomed Mr. Green, Mr. Gundry, and the other officials. Last summer, he observed, Mr. John Harland, the Chairman of the Cricket Club, suggested that the Cray Gas-Works Social Club should run a football team. The owners of this piece of land were approached. Then the Company's Sports Guild were appealed to for financial assistance, and a five years' lease of the land was entered into. The Guild Council had also granted £50 towards the pavilion, the balance to be raised at Cray. The Company had themselves agreed to defray all costs of providing lighting and heating in the pavilion.

Mr. Rudling concluded by asking Mr. Green to convey the sincere thanks of all the members of the Cray Works Club to Dr. Carpenter and the other Directors for their generous help. Their staff at Cray appreciated the assistance, which would enable them to live healthier and happier lives.

Major J. A. Gould, in asking Mr. Green to open the pavilion and declare the sports ground open, said that the whole of the Company's sports grounds were being inspected that day by Mr. Green. He assured everybody that the Directors were taking a very keen interest in the sports and pastimes of all the employees and without their help it would be impossible to achieve anything.

Mr. Green said it was a pleasure to him to open the pavilion and ground. The pavilion was built by the united efforts of everybody connected with the Sports Guild and the Company, and showed what could be accomplished by united effort. He wished them all success and hoped they would spend many happy afternoons taking part in their sports there.

Mr. Green then unlocked and opened the entrance door and invited all to enter the building.

On the motion of Mr. H. G. Everett, seconded by Mr. John Harland, a vote of thanks was accorded Mr. Green for his visit and to those who accompanied him.

A Hundred Years of Public Service at Sudbury

The Sudbury Gas and Coke Company celebrated its Centenary last Monday.

On Jan. 27, 1836, the Mayor of Sudbury presided over a meeting of the burgesses, and it was resolved: "That in the opinion of this meeting it is expedient to form a Company to light the town with gas." The Company was immediately formed "under the name, title, or firm of the Sudbury Gas and Coke Company, for the express object and purpose of manufacturing and producing inflammable air or gas from coal, oil, or other materials, and of supplying therewith the Town of Sudbury, in the County of Suffolk;" and, after an uninterrupted career of progress, has now, in 1936, completed a century in the public service.

A contract having been obtained from the Commissioners of the Sudbury Paving and Lighting Act for lighting the town with gas for a period of 30 years (subsequently reduced to 21 years), the "Sudbury Company" engaged the services of Messrs. George and James Malam to erect a Gas-Works and plant on a plot of ground adjoining the Quay on the bank of the River Stour at Sudbury.

The original Office of the Company, bearing the inscription "Sudbury Company, 1836," still stands, though it is no longer used for the purpose of a "counting-house," having been superseded by more commodious and up-to-date premises. But the remainder of the buildings and plant have been transformed during the century out of all knowledge. Instead of five small "ovens" as originally used for coal carbonization, the present retort house accommodates a total of 42 horizontal retorts.

Three gasholders erected in 1881, 1910, and 1930, of a capacity of 43,000 cu.ft., 100,000 cu.ft., and 200,000 cu.ft. respectively, are in constant use; the first-mentioned taking the place of the original "gasometer" of 1836, while another holder erected in 1855 has recently been demolished, and the tank converted into an additional tar well.

The Company possesses a well-designed and fully equipped showroom in a prominent position on the Market Hill, which was opened in 1934 to supersede smaller premises in Station Road which had served the needs of the Company for a number of years.

Since 1927, the gas requirements of the neighbouring village of Long Melford have been met from the Sudbury Works, the Long Melford Gas and Coal Company, Ltd., having discontinued the manufacture of gas in favour of purchase in bulk from the larger Company. This procedure has not only contributed to the growth of the Sudbury undertaking, but has given full satisfaction to all concerned.

Early Days.

When the Works was in readiness for the commencement of operations in November, 1836, the Directors, in whom was vested the Management of the Works on behalf of the Company, appointed Mr. Joseph Martin as Superintendent; though Messrs. Malam, who erected the Works, were required by the terms of their contract to exercise responsible supervision over the working of the establishment for the first six months. The Superintendent was to hold also the office of Collector.

At the Annual Meeting of shareholders in November, 1844, it was intimated that it might be advisable to lease the Works for a term of years under a contract. Six tenders were received, but all were deemed unsatisfactory, and further consideration was deferred until July, 1845. An offer was accepted from Mr. James Wright, Superintendent of the Works, to undertake the entire management, in conjunction with Mr. George Stevens, of Stowmarket, in the Company's interest for a period of twelve months, with a view to putting the establishment in good condition.

In April, 1846, the Supervising Committee reported that the new system of working had increased the production of gas from 8,500 cu.ft. per ton of coal to 10,250 cu.ft.; and had likewise produced coke of superior quality, and in quantity per ton above the former average.

The lease granted to Mr. James Wright being due to terminate in December, 1856, it was agreed to extend it for 1½ years to allow the Directors an opportunity to formulate fresh plans, and to undertake the valuation of the Works.

It was then decided to invite tenders for a new lease of the Works, and the Directors accepted the offer of Mr. Alexander Roger Stark, of the Woolwich Consumers' Gas Company, for a ten years' lease.

In October, 1864, consequent upon a demand for a reduction in the price of gas, an extension of the lease until 1868 was agreed upon, on revised terms, which included the stipulation that the price should be reduced from 7s. 1d. to 6s. 3d. per 1,000 cu.ft. as from Jan. 1, 1865.

Subsequent conditions do not appear to have been very satisfactory, for on Feb. 10, 1868, a public meeting was held in the Town Hall, and addressed by Mr. A. Flintoft, who was known as the "Gas Consumers' Agitator." It is stated that he commenced the meeting by placing two lighted candles on the table; these, he declared, were necessary "in order to see the gas!" The meeting passed resolutions expressing not only dissatisfaction with the price, quality, and quantity of the gas supplied, but also indignation at the manner in which complaints were ignored by the Lessee and his servants!

In November, 1871, Mr. Thomas Hill Methven, of Bury St. Edmund's, was accepted as tenant, and Mr. Charles William Grimwood, who had been Clerk and Collector since 1868, was now appointed Manager of the Works. Owing to the death of Mr. Methven in April, 1875, the lease was transferred in the following October to Mr. Ebenezer Goddard, of Ipswich.

On June 25, 1881, a new lease was granted to Mr. Charles William Grimwood, who had been managing the Works for Mr. E. Goddard; considerable improvements were made immediately to the plant, a gasholder, new condensers, and four new purifiers being erected.

The lease was terminated by agreement on March 25, 1909, and the business was thenceforward carried on direct by the Company, with Mr. Charles George Grimwood (son of the former Lessee) as Manager and Secretary. In the meantime, the Company had been registered under the "Companies Act," 1903.

Beyond changes in the status of officers in 1921, when Mr. Charles G. Grimwood resigned his position as Manager and Secretary in order to occupy a seat on the Board with the title of Managing Director, and Mr. John Read, who had been Clerk and Collector since 1916 (following the decease of Mr. E. Ecclestone), was appointed Secretary, the Management of the Company has continued on the same lines from 1909 to the present day, except that Mr. Charles Edward Grimwood, son of the Managing Director, was appointed Works Manager in January, 1932.

The guests of the Company, to the number of about seventy, gathered at the Town Hall, those same premises where a hundred years ago the Mayor convened the meeting which resulted in the Company's formation. And, very suitably, Mr. Grimwood had set out for inspection an interesting collection of souvenirs and records of the Company, including the first prospectus and minute book. The Corporation regalia were also displayed. His Worship the Mayor of Sudbury (Councillor P. S. Head), Col. H. W. Burton, O.B.E., M.P., and Sir W. Gurney Benham, J.P. (Chairman of the Colchester Gas Company), were present; and the many gas men from the Eastern Counties included Mr. Thomas Glover, C.B.E., late Chief at Norwich. Mrs. Eileen Murphy, Home Service Director of the "B.C.G.A.," was also present.

Luncheon was served, and a short toast list was enthusiastically honoured. The Chairman, Mr. Richard Orttewell, proposed the Guests, to which reply was made by the Mayor and by Sir Gurney Benham; the latter with many amusing reminiscences of Eatanswill. Col. H. W. Burton, M.P., proposed "The Gas Industry," responded to by Mr. Glover and Mr. Townsend. "The Sudbury Gas and Coke Company, Ltd.," was in the hands of Mr. Frank Prentice, who recounted something of the remarkable progress made by the Gas Industry over the years. In reply, Mr. C. G. Grimwood testified to the fact that in 100 years the Company had never let their consumers down. A near thing in the general strike was averted by the arrival of three trucks of coal from Ipswich—their big neighbour whose readiness to help was always greatly appreciated by the Sudbury Board.

During this reception, the Mayoress received the ladies at the Victoria Hall, and they were subsequently entertained at luncheon by Mrs. Grimwood. In the afternoon Mrs. Murphy entertained them with a short lecture on gas and its early history.

A number of the visitors took the opportunity of inspecting the small, but excellently equipped and positioned, showroom of the Company.

AN ANALYSIS OF

The Central Electricity Board Accounts for 1932-1935

A Short Memorandum by
Hyde C. Burton, F.C.A.

In view of the interest taken by the Public in the "Grid" and the large expenditure which it has necessitated, the attached summarized statements compiled from the published accounts for the four years 1932 to 1935 afford interesting speculation as to the eventual outcome of this vast experiment.

Commencing with the Capital Account the Total Expenditure at Dec. 31, 1935, was £50,662,430, a pretty large figure. The major point of interest, however, lies in the analysis of this expenditure which appears to be as follows:

—	£	Percentage of Total Expenditure.
Cost of the "Grid" itself	26,278,983	51·87
Other expenditure relative thereto	166,530	0·33
Expenditure incurred in standardizing frequency	14,863,398	29·34
Interest charged to capital, discounts, expenses of issues	9,177,069	18·11
Sundries	176,450	0·35
	£50,662,430	100·00

The Interest Charges, Discounts, and Costs of Capital Issues will presumably have to be written off to Revenue, that is, charged in the price of electricity, at some time or other.

In the meantime the total charge to Capital for these expenses is shown in the following table:

Year.	Interest, Discounts, and Cost of Issues charged to Capital. Total at Dec. 31.	Expressed as a Percentage of the total real Capital Expenditure—*i.e.*, Cost of Grid and Standardization of Frequency.
	£	%
1932	4 125,143	14·5
1933	5 958,885	17·1
1934	7 776,541	20·3
1935	9,177.069	22·2

It is significant that the cost of these particular items charged to Capital Account continues to grow, and the percentage that these items bear to the total expenditure steadily increases.

Standardization of frequency accounts for nearly *fifteen million pounds* or 29·34% of the whole. Whether this large expenditure is of itself revenue-producing is a matter that can only be conjectured, but in the ordinary way one would imagine that expenditure which is incurred in altering apparatus so as to make it conform to different conditions is not revenue-producing, and would therefore be written off out of profits at some time or other, in order to avoid "dead capital" remaining in the books.

So far, therefore, as the Capital Account is concerned in its relation to the profit earned (and it must be remembered that as yet no interest payable on the Board's securities has been charged against the profits), we have the following position:

—	"Profit."	Percentage of Total Expenditure Charged to Capital.
	£	%
1932	73,845 =	0·23
1933	34,500 =	0·08
1934	88,493 =	0·19
1935	1,047.344 =	2·07

It will be observed that the 1935 "profit" (before, of course, charging interest of £1,382,929) shows a considerable increase over the previous year, so that it looks as if the Grid were at last getting into its stride. The Gross Receipts from the Sale of Energy rose from £18,695,879 in 1934 to £22,911,635 in 1935—an increase of 22½%—a very respectable augmentation of revenue. The "profit" rose from £88,493 in 1934 to £1,047,344 in 1935, an increase of 1,083%—a very impressive figure indeed.

Let us, however, examine the Revenue Account a little more closely and see how the Accounts would look if there were charged against the Revenue from the Sale of Electricity the interest and sinking fund instalments which are almost wholly (in effect) charged to Capital.

After *crediting* the Accounts with interest receivable from investments and interest recoverable from the Ministry of Labour in respect of unemployment grants, and after *debiting* the Accounts with the interest paid during the year and with all sinking fund instalments, the position appears to be as follows:

	£
Net trading loss—1932	885,447
" " —1933	1,537,010
" " —1934	1,666,626
" " —1935	843,661

The amounts for which credit has been taken for interest recoverable from the Ministry of Labour in respect of unemployment grants as previously mentioned were as follows:

	£
1932	101,214
1933	320,523
1934	374 398
1935	434 988

Presumably these amounts will not be recovered indefinitely from the Ministry of Labour, and at some time or other they will cease and the Revenue from the Sale of Electricity will have to shoulder the amounts now recoverable.

How have the Net Trading Losses referred to above been disposed of? The answer seems to be:

(1) By charging a proportion to the Electrical Commissioners.
(2) By charging the balance to Capital Account.

No details are available from the Accounts as to why or how the Electricity Commissioners are chargeable, or from what fund the Electricity Commissioners are enabled to pay the handsome subsidy which steadily increases year by year. The fact remains that the before-mentioned trading losses are dealt with as follows:

—	True Trading Loss after charging Interest and Sinking Fund Instalments.	Charged to Electricity Commissioners.	Charged to Capital (Balance).
	£	£	£
1932	885.447	339 790	545.657
1933	1.537.010	446 087	1 090 923
1934	1,666.626	475,149	1,191,477
1935	843.661	531,620	312,041
Result of four years	£4.932,744	£1.792,646	£3.140,098

Taking the 1935 Accounts as an example, the interest chargeable to Capital Account is shown as £1.382,930, but a scrutiny of the attached analysis of the Revenue Accounts shows that this amount is really made up as under:

	£
Profit on sale of energy carried forward (account No. 5)	1,021,221
" " " (account No 5a).	26,113
Increase in carry forward of interest fund (account No. 8)	23,555
Proportion of trading loss	312,041
	£1,382,930

Thus, despite the enormous increase in "apparent"

Central Electricity Board Accounts for the Years 1932, 1933, 1934, and 1935.

1. REVENUE ACCOUNT.

Profit on Sale of Energy.			Interest Charged to Capital Account.
1932	£ 73,845 = 0·23%	on total capital expenditure to Dec. 31, 1932	£ 867,629
1933	£ 34,500 = 0·08,,	,, ,, ,, ,, Dec. 31, 1933	£1,170,497
1934	£ 88,493 = 0·19,,	,, ,, ,, ,, Dec. 31, 1934	£1,285,722
1935	£1,047,334 = 2·07,,	,, ,, ,, ,, Dec. 31, 1935	£1,382,930

2. CAPITAL ACCOUNT.

Summary of Capital Expenditure as at Dec. 31, 1932, 1933, 1934, and 1935.

Total Expenditure to Date	1932.		1933.		1934.		1935.	
	£	£	£	£	£	£	£	£
Construction of grid	19,854,044		23,647,610		25 143,522		26,278,983	
Other expenditure preliminary to construction	151,464		157,813		162,752		166,530	
Expenditure on standardization of frequency	8,378,158		10,927,161		12,936,304		14,863,398	
Vehicles, tools, and instruments	..		34,528		45,699		57,472	
		28,383,666		34,767,112		38,288,277		41,366,383
Capitalized interest	1,637,280		2,807,777		4,093,499		5,476,428	
Discounts on issues of stock	1,882,269		2,404,984		2,834,956		2,848,136	
Costs of issues of stock	605,594		746,124		848,086		852,505	
		(*a*)4,125,143		(*b*)5,958,885		(*c*)7,776,541		(*d*)9,177,069
Payments to Minister of Transport, &c. (including interest)		118,978		118,978		118,978		118,978
		£32,627,787		£40,844,975		£46,183,796		£50,662,430

(*a*) Interest, discounts, and expenses of issue (revenue charges in an ordinary trading concern) charged to capital = 14·5 % of actual expenditure on construction
(*b*) ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, = 17·1 ,, ,, ,, ,, ,,
(*c*) ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, = 20·3 ,, ,, ,, ,, ,,
(*d*) ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, = 22·18,, ,, ,, ,, ,,

Central Electricity Board.

ANALYSIS OF REVENUE ACCOUNT—1932-1935.

	1932.	1933.	1934.	1935.		1932.	1933.	1934.	1935.
	£	£	£	£		£	£	£	£
Interest paid during year (Account No. 8)	1,076,612	1,735,877	1,958,200	2,107,433	By profit on sale of energy (Account No. 5)	..	4 320	86,102	1,021,221
Redemption fund instalments and interest not charged to revenue account (Account No. 7)	138 994	181,728	191,429	233 420	,, profit on sale of energy (Account No. 5a)	73,845	30,180	2,351	26,113
						73,845	34.500	88,493	1,047.334
					,, interest receivable from investments, &c. (Accounts Nos. 7 and 8)	65,100	25,572	20,112	14,870
					,, interest receivable from Ministry of Labour under Unemployment Grant* (Accounts Nos. 7 and 8)	191,2·4	320 523	374.398	434,988
						330,159	380 595	483.003	1,497.192
					Balance—Trading loss	885,447	1,537.010	1,666,626	843 661
	£1,215 606	£1 917.605	£2,149,629	£2 340 853		£1,215,606	£1,917,605	£2,149.629	£2,340,853

* Presumably not recoverable indefinitely.

Method of Disposing of Deficit.

	£	£	£	£		£	£	£	£
Deficit brought down	885.447	1,537.010	1,666,626	843 661	Charged to Electrical Commissioners	339.790	446.087	475,149	531,620
					Charged to capital account (*in effect*)	545 657	1,090.923	1,191,477	312,041
	£885 447	£1,537,010	£1,666,626	£843,661		£885 447	£1,537,010	£1,666,626	£843,661

Reconciliation of NET DEFICIT (as above) with INTEREST charged to CAPITAL ACCOUNT as shown by Accounts.

	£	£	£	£
Profit on sale of energy for year (Account No. 5) carried forward	..	4 320	86,102	1,021,221
,, ,, ,, ,, (Account No. 5a) credited to capital	73,845	30,180	2,391	26,113
Increase in carry forward of Interest Fund (Account No. 8)	248,127	45,074	5.752	23.555
Proportion of trading loss charged to capital	545,657	1,090.923	1,191,477	312,041
Interest charged to capital as shown by accounts	£867,629	£1,170.497	£1,285,722	£1,382,930

profit for the year 1935, there is an actual trading loss for the year, after charging up interest and sinking fund instalments, of £843,661 compared with £885,447 in 1932, and the proportion of the loss charged to Capital Account is £312,041 in 1935 compared with £545,657 in 1932. Further, the net trading loss in 1932 of £885,447 was after crediting only £191,214 recoverable from the Ministry of Labour, whereas the net trading loss of 1935 of £843,661 was after crediting £434,988 from the same source, and as previously stated these amounts cannot, presumably, be recovered from the Ministry of Labour indefinitely.

In 1934 there was an important note at the foot of the Redemption Fund Statement to this effect—viz., that for a period of five years from the date of borrowing, the Board can forget all about such details as providing for the redemption of money borrowed and for writing off the discounts allowed in respect of such borrowings, unless the expenditure becomes remunerative at an earlier date. The note then added: "The Expenditure had not become remunerative, but the maximum permitted suspensory period expired in respect of the sum of £274,249, borrowed up to Dec. 31, 1928. Pending the allocation of that sum (the meaning of this is not clear) the amount of the Redemption Fund Instalment has been calculated on an unexpired repayment of twenty years." Presumably the Sinking Fund Instalments and interest charged to Revenue of £9,801 is the result of this calculation.

In 1935 there is a very similar note, only in this case it is

stated that, although the expenditure has not yet become remunerative, the permitted suspensory period has expired in respect of sums amounting to £1,760,061 expended to Dec. 31, 1929. Again the strange phrase is used: "Pending the allocation" of the sum of £1,413,303, the Redemption Fund instalments have been calculated on unexpired repayment periods of twenty years, the balance of £346,758 being calculated on an unexpired repayment period of 24 years. Presumably the Sinking Fund instalments and interest charged to Revenue of £66,065 is the result of this calculation.

The Gross Profit on the Sale of Electricity (A/c. No. 5) for 1935, after charging the cost of electricity purchased, *but before charging ordinary trading expenses* (not interest), was £2,116,813, or 9·3% of the gross sales of £22,729,656.

Let us assume that for 1936 the sales of electricity show an increase of 20%, giving gross receipts of £27,275,000. The cost of purchasing electricity will probably be much the same, so that, if we allow a gross profit of 10%, the Net Profit will be £2,727,500. No Capital was issued during 1935 and £145,921 was redeemed, so that the interest payable will probably be approximately the same as in 1935—viz., £2,107,433. General expenses will probably not show much of an increase except for cost of transmission, which is approximately 1% of the sale of energy.

We can therefore estimate the 1936 expenses with reference to the 1935 Expenses of £1,112,951, and add to that figure the estimated increase in cost of energy used in Transmission (say) another £45,000, and for additional for Sinking Fund (say) £50,000—a total for expenses of £1,208,000.

	£	£
Estimated gross profit with 20% increase		2,727,500
Sundry rents, &c. (say)		17,000
Total gross profit (estimated)		£2,744,500
Estimated total expenses		1,208,000
Net profit (before charging interest)		£1,536,500
Interest payable—as for 1935 (say)		2,107,000
Trading loss (estimated)		£ 570,500
If the same amount is received for interest on investments of	£14,870	
And the Ministry of Labour is still contributing an amount of	434,988	
		449,858
The deficit will be reduced to		£ 120,642
And if the Electricity Commissioners still come to the rescue to the extent of their 1935 contribution of		531,620
There will be a surplus after meeting interest and sinking fund instalments of		£ 410,978

Summarizing the above figures, if the sales of electricity increase for 1936 by 20% and the Electricity Commissioners and the Ministry of Labour contribute as for 1935 the sum of £966,608, it would seem that the Central Electricity Board will have available a surplus (after charging up all Interest and Sinking Fund instalments to revenue) of £410,978. There is an indication, therefore, that at long last the Grid is on the way to making a Trading Profit, but one would like to know a little more of the subsidy from the Electricity Commissioners, for the whole (and more) of the above-estimated surplus for 1936 with a 20% increase will, in effect, be provided by that body.

It is not to be wondered at that the Public sees a bitter warfare between the two great public services of electricity and gas, and so far as the layman can judge, there is no chance (as there ought to be) for these two utilities to work in harmony side by side. Whether this is to the ultimate benefit of the consumer seems doubtful, but it is quite obvious that every nerve is being strained by the Electricity Board to make the Grid pay, and the additional sale of energy must largely be obtained, so it would seem, at the expense of the Gas Industry.

The writer has no knowledge of the amount of domestic and public gas lighting in existence, but it would appear that the total lighting load equation is a factor upon which the Grid may depend in a great measure for its ultimate success, and to which the Gas Industry must pay particular attention, since the greater the amount of plant that has to be put down to meet the lighting load demand, the more can the electricity industry offer cut rates at off-peak hours, with the express purpose of cutting into the Gas Industry's day load, and securing just so much of that load as they require to meet the difference in output between their night and day demand. One cannot help feeling that the electricity industry would find itself in an unpleasant position if, instead of being able to get away with some of the cream, it were suddenly called upon to look after the rest of the milk as well and supply, shall we say, the daily cooking load of 10,000,000 gas consumers, or a sudden demand for warmth at present met by a few million gas fires.

It would be interesting, therefore, to know what proportion of the gas sold throughout the country is used for lighting. In the view of the writer it is essential that the Gas Industry should realize that any loss of gas lighting for either domestic or public purposes goes deeper than the mere loss of revenue entailed, and that it must expect a continuation, and even intensification, of the severest competition as long as there is a lighting load to be won by which the off-peak load can be subsidized during non-lighting hours.

The Complexities of Technical Education

The provision of technical education, by which is meant a vocational education to fit youth to the needs of industry and commerce, has been developed unsystematically, if not haphazardly, in England during the last century in an endeavour to meet the varying needs of individuals, localities, and industries. Any picture of the system as now existing must only reflect the complexity of the situation.

In the recent publication of the New Fabian Research Bureau* the problem of technical education is assumed to have a two-fold aspect: Firstly, to provide the individual with instructions in the principles and practice of his vocation and also to widen the scope of his powers and interest with a continued education; and, secondly, to provide the nation with artizans and clerks, foremen and salesmen, works' managers, technicians, and directors. With the ready co-operation accorded educational authorities by industrialists in various areas this would seem a readily accomplished task. Unfortunately, however, in a great number of cases the system fails on account of the pupil's ignorance of the basic principles essential for an intelligent appreciation of the physics of industrial processes. These principles do not form part of the curriculum of primary education, which supplies the great majority of technical school pupils, and the time allotted to any rational training scheme does not permit of these principles being taught in the technical school. Although secondary education provides the student with a sound knowledge of most basic principles it contributes little to the solution of the problem since, the normal age for most apprenticeships being lower than 16, less than 20% of secondary school leavers enter industry.

Although efforts are now being made in some schools to introduce a more realistic curriculum an enormous amount of work remains to be done. One of the clearest lessons to be learnt from a perusal of the history of technical education as set out in the N.F.R.B. publication by Tobias Weaver is that no specialized vocational instruction is possible except on a satisfactory basis of primary and post-primary education. To bring home to the reader another aspect of the problem, Mr. Weaver draws attention to the great variety of type, origin, and aim of the many technical institutions up and down the country.

On the assumption that only on the firm foundation of a good general education can a stable system of technical training be built, Miss Barbara Drake, in the second part of the publication, explains the socialist solution of the problem. The scheme includes the setting up of a standing advisory committee composed of employers, trade unionists, and educationalists for each important industry or group of industries; the establishment of central technical colleges for each industrial area which would cater for full-time students in the higher grades, and to which local colleges would be affiliated; and a system of recruitment for each type and grade of employment properly related to the previous education and training of the worker.

*Technical Education—An Immediate Programme. London: Victor Gollancz, Ltd., 14, Henrietta Street, Covent Garden, W.C. 2. and The New Fabian Research Bureau, 37, Great James Street, W.C. 1. Price 6d.

Association of Tar Distillers

Annual Dinner

The Tar Distillers held their Annual Dinner on Tuesday, April 21, at the Café Royal, Regent Street, W. 1, when about 250 members and guests enjoyed the customary informal, yet excellently organized, function. The President, Mr. J. Reginald Lane, was in the chair—a position which, he said, would be his until midnight, when his successor, Major A. G. Saunders, would come into office. Major Saunders gave the toast of "Our Guests," to which the Minister of State for Mines, Captain H. Crookshank, responded.

LONG SERVICE TO THE GAS INDUSTRY

A number of firms of long standing on the contracting and manufacturing side of the industry have collaborated with the "JOURNAL" in the production of a series of articles, under the above title.

Lighting Trades, Ltd., and Welsbach Light Co., Ltd.

The Welsbach Light Company, Ltd., which now with Lighting Trades, Ltd., forms a subsidiary company of Imperial Chemical Industries, Ltd., was formed in 1886 to exploit the patent rights of Dr. Carl Auer (who subsequently became Dr. Auer Von Welsbach), the inventor of the incandescent gas mantle. The world's patent rights were vested in the Austrian Incandescent Company, with whom he was associated. The English rights were first acquired in 1886 by a small syndicate, who subsequently formed the Incandescent Gas Light Company (afterwards

The Original Street Lighting Lamp.

The "Kern" Anti-Vibrator Burner.

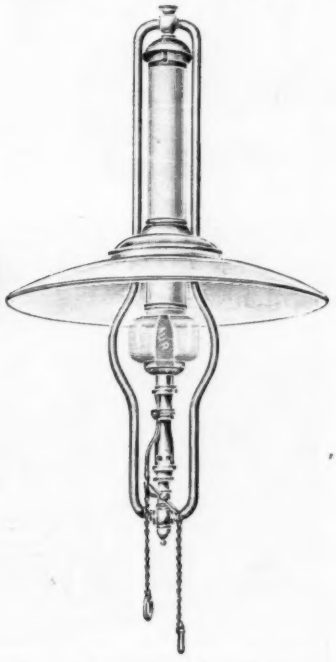
called the Welsbach Incandescent Gas Light Company), which commenced the manufacture of gas mantles in Palmer Street, Westminster, in 1887. It will be seen that the firm is this year celebrating its Jubilee.

History of the Gas Mantle.

At that time the fabrics used for the manufacture of gas mantles were entirely of cotton imported from Vienna. All the various manufacturing processes, however, were carried out at Westminster, and the accompanying illustration reproduced from the issue of the *Pictorial World* for Oct. 6, 1887, shows interior views of the different departments at the Works. In an article in the same issue a writer in the *Pictorial World* reported that "the new light is very rapidly making its way into use. It has the great advantage over the electric light that it requires no new apparatus beyond a new burner at a cost of fifteen shillings fitted to the existing gas-jets." On the subject of the Works the same writer remarks: "It is a very pleasant sight to see the new premises, roomy, airy, and clean, and to see that the various processes of manufacture give suitable employment to a large number of young women, whose appearance, dress, and conduct show that they are adding to the earnings of many a respectable family of a class above that of the ordinary artisan."

As is well known, thorium oxide is one of the rare earths extensively used in gas mantle manufacture, and at that time there was only one source of supply of monazite sand, from which thorium is extracted. This was on the Brazilian coast, and was owned by the Austrian company from whom the English company had to purchase all their supplies at exorbitant prices. In 1897, therefore, the Welsbach Light Company was floated with a big capital to acquire the Austrian parent company, as well as the Irish Incandescent Company, a separate company exploiting the Irish patents; but no sooner had this been brought about than a source of supply of monazite sand, giving a better yield of thorium sand, was discovered at Travancore in India. The result was that the Austrian company's assets dried up enormously, the dividends decreasing from 100% or more to

The Original Cylindrical Street Lighting Lamp.



Indoor Self-Intensifying Lamp.

about 40% during the first year after purchase. The price of mantles came down enormously as a result, and this led ultimately to the reconstruction of the Welsbach Light Company and a ruthless cutting down of capital.

In 1900, the Company absorbed the Sunlight Incandescent Company and the first pink-tinted mantle was marketed. This type came into demand again last year in connection with the Jubilee celebrations. Prior to the 1898 patent, gas mantles gave a distinctly greenish tint, but no sooner had this objection been overcome than a demand sprang up for green-tinted glassware.

It might be interesting to recall at this stage that when the incandescent light was first introduced into this country the burners were a guinea each and the mantles five

shillings. The mantles were at that time so frail that transport by ordinary means was impossible, and agents came up from all parts of the country and took away their requirements. When the original negotiations were taking place for the purchase of the English rights, the first mantle ever seen in this country was brought over from Vienna suspended in a birdcage to avoid damage, and the writer remembers very well an old sole agent of the Company in Ipswich who related to him how he used to journey up twice a week to get his mantles, and would not even trust them to the rack in the railway carriage, but invariably carried them very carefully on his knee, to find anything from 30% to 50% were broken on arrival. This, of course, was prior to the introduction of collodionizing, which is merely a coating process introduced to meet this transport difficulty.

Development of the Gas Burner.

The incandescent gas mantle, together with the Welsbach burner, revolutionized gas lighting in those days and set back electrical competition by twenty years or so. The original upright burner had a 12-in. chimney, and the mantle was supported at the top from a circular wire frame with a side-supporting rod into the burner. Considerable trouble was experienced early on in getting a chimney to stand up to the heat generated, and this was eventually overcome by a chimney formed of a series of glass rods held together in cylindrical form with a clip at the top and bottom. This was later superseded by the original Jena hard glassware, which the Welsbach Company first introduced into this country, and of which they originally held the sole agency. Subsequently, the more popular "C" type of burner with central magnesia rod came into general use, and this pattern has been copied down to the present day. This in turn was supplanted by the world-renowned Kern burner, made in six sizes, and which gave a duty of 25 candle-power per cu.ft. against 14 candle-power from the "C" burner; and here again in the initial stages of development certain troubles cropped up, notably those caused by varying gas pressures, and to overcome them the Company sent a staff of engineers all over the country to test pressures and to determine the most suitable size of nipple for each size of burner.

The Kern burner was first introduced to the Gas Industry at a private exhibition held at the old Niagara Hall in Westminster, which was attended by the late King Edward, then Prince of Wales, and burners were subsequently installed in Sandringham House. This burner, with or without the anti-vibrating device, became the standard burner for public lighting purposes, many hundreds of thousands having been supplied in this country and abroad.

After considerable research, the Kern patents were adapted and applied to the production of gas fires on the Kern principle, the original Kern radiator being the pioneer of the single row of pillar or columnar radiant gas fires with gas regulating device. At a later date came a further application of the Kern principle in the form of the well-known Welsbach self-intensifying lamp, which was made in three sizes, giving duties of 150 c.p., 300 c.p., and 600 c.p. from one upright mantle, and this form of lighting became immensely popular both for indoor and outdoor purposes. These lamps worked at ordinary pressure on the induced draught principle, and gave a duty of some 30 candles per cu.ft., which was remarkably high in those days. They were also very cheap to maintain. Many of the cylindrical type of S.I. street lamps can still be seen in use, notably at Newcastle-on-Tyne and Margate, although most of them have now been converted by the introduction of inverted clusters.

Later Developments.

The original upright burner was never patented, with the result that spurious burners were frequently introduced by other houses. To overcome this difficulty the mantles were sold under a limited licence to be used only with the genuine burners supplied by the Company, and when a purchase of mantles was effected either through a shopkeeper or a gas showroom it was necessary to sign one of these forms of undertaking with each purchase, for which purpose books of such forms were provided by the Company.

Spurious mantles also were introduced, resulting in an immense amount of litigation by the Company to suppress them, and the late Lord Moulton (then Mr. Fletcher Moulton) held a more or less perpetual brief, being constantly in the Courts on the Welsbach Company's behalf defending their patent. In fact, it has been said that it was largely through this constant practice that he became a recognized expert on patent law.

The business went on to develop so rapidly that it was soon necessary to look for larger works. As a result a factory in Broomhill Road, Wandsworth, was built and occupied by the Company in 1902. The Company remained in occupation of this factory up to as recently as 1928, when it was taken over by Imperial Chemical Industries, Ltd., and the manufacture merged with that of Lighting Trades, Ltd. The Company's present factory at Ravensbury Terrace, Earlsfield, has now the largest output of any mantle factory in the world.

Coke for the Open Grate

by
F. M. H. TAYLOR

In which the Author deals with the properties of coke and compares their effect on performance in the open grate.

(a) Field of The Open Fire.

How far the open fire is a typical English institution is a question frequently asked by those interested in providing heat and comfort to the English household. Is there a prejudice in favour of the open fire and the flaming fuel bed, or does the public instinctively demand positive ventilation through a flue for their living room? It is argued by some that there is a deep-rooted tradition by which the fireside is associated with English family life, a tradition which will be perpetuated whatever arguments may be put forward in favour of fuel economy or smoke abatement.

(b) Alternatives to the Coke Grate.

There are over 10 million families in the British Isles with one or more open fireplaces, and some 40 million tons of coal are burnt annually for domestic uses largely in these open fireplaces. It is difficult to say how much of this is replaceable by fuel used in one or other of the following alternatives ways:

(*a*) Central heating.
(*b*) Gas fires or radiators.
(*c*) Open coke fires.
(*d*) Other smokeless fuels such as semi-coke.

While a proportion of the 40 million tons of raw coal now burnt in British homes during the year may be replaceable by gas, it should be recognized that practically all of it is replaceable by coke.

(c) Potential Demand for Coke.

The growing public realization of the smoke evil, and the appreciation of higher efficiency and lower cost of high-temperature coke (40s. per ton as compared with 50s. for household coal and 58s. for semi-coke) is effecting a steady change over from coal to coke in the open grate.

Suppliers of smokeless fuel are to a certain extent reaping the benefit of the public demand for fuel free from smoke and dirt. The lower cost of high-temperature coke, coupled with the more recent improvements in the coke grate, indicate that the sales of open grate coke will increase from year to year, until a large proportion of domestic coal is replaced.

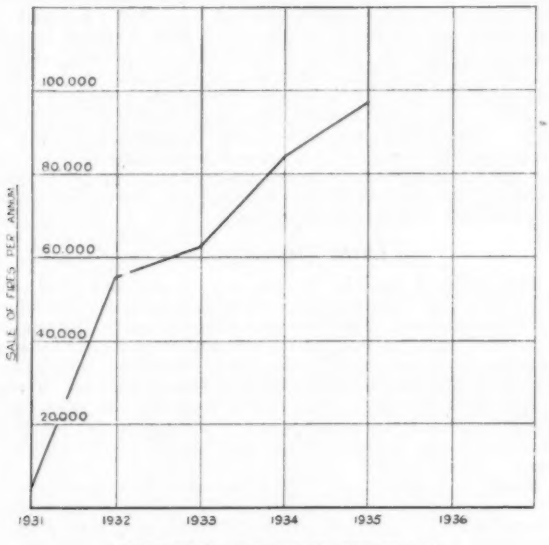
At present, nearly 100,000 new grates are installed annually, and this, at the modest estimate of two tons per grate, represents an increased coke consumption of 200,000 tons per annum.

Generally speaking, the open fire is an economical proposition when a room is to be used for several hours during a day, such as the living room of a house, and where the cheerful appearance is all-important, and where, also, ventilation is highly desirable, if not essential. This ventilation is provided conveniently by the open fireplace; anything from 5,000 to 30,000 cu.ft. of air per hour may be drawn up the chimney by the draught induced by the open fireplace. This is more than sufficient to provide that degree of air change (2-6 changes per hour), which gives the stimulating feeling of comfort to the occupants of the room, especially when compared with a room heated by

convection, as, for example, by central heating, electric fires, and flueless gas appliances.

The Properties of Coke and their Effect on Performance in the Open Grate.

It is, perhaps, first of all, advisable to enumerate the properties which the user demands from open grate coke,



GRAPH SHEWING PROGRESS OF SALE OF OPEN COKE GRATES IN THE LONDON AREA.

and later to discuss the features of the open grate designed to give the best results from the coke.

Ignitability.

The ignitability of coke is dependent on its structure, its chemical composition—*i.e.*, the proportion of the various allotropic modifications of carbon present, on the bulk density, and on the volatile matter content, all in turn dependent on the method of carbonization. It is obvious that the coke with a higher volatile matter content will provide enough gas on heating to ignite readily. A light cellular structure is also more easy to ignite, because the heat required to raise the temperature to ignition point is lower than for a denser material. The readily ignitable coke obviously gives greater convenience in the house, and is economical irrespective of whether wood or gas is used for lighting the fire.

The 22nd Report of the Research Committee of The Institution of Gas Engineers publishes a method of determining the ignition temperature of coke, and in this test it is taken to be the temperature at which combustion becomes self-supporting. At this stage, combustion proceeds without the assistance of external heating.

The relatively unreactive cokes, such as metallurgical cokes, have ignition temperatures over 500° C. while the normal gas coke has values falling between 400° and 500° C.

An important factor in the ignitability of coke is the presence of a small reactive nuclei which start combustion rapidly and then generate sufficient heat to ignite the rest of the mass of fuel. This is why some cokes are not as reactive on second lighting as on the first, and why a readily ignitable coke is not necessarily as flexible in combustion as would be expected, and *vice versa*. This unevenness of reactivity may be produced by blending, and is more of an advantage than a disadvantage in the fuel.

Flexibility.

The flexibility depends like the ignitability upon the volatile matter and structure, and on the lowest temperature at which the fuel will support combustion. This lowest combustion temperature or ignition temperature varies a good deal from fuel to fuel, and, although it is as low as 300° F. in some anthracites, it may vary from 400° to 800° F., or even more, in coke.

Reactivity.

It is well-known that there are two types of reactivity. The first is the reactivity to carbon dioxide, whereby this gas is reduced to carbon monoxide, and the other is the reactivity of coke to oxygen at temperatures over approximately 500° C. or red heat. It is the difference in the reactivity to oxygen between 500° and 800° C. which determines the ease with which the fuel will ignite and also its flexibility in use.

Cokes at temperatures over 800° C. are very reactive to oxygen, and there is essentially no difference between them. The rate of primary combustion then merely depends on the ease with which the fire can obtain its free supply of air. This depends on the draught, the rate at which the air is supplied, and the size of the grate; in other words, the amount of area exposed to the incoming air.

The reactivity of coke to carbon dioxide is of importance in determining the composition of the gases in the upper part of the fuel bed. Coke with a high reactivity gives a sufficiently large proportion of carbon monoxide to burn with an attractive blue flame on the top of the fuel bed. The flames over the fire give the cheerful effect so often associated with coal fires, an effect which will always be demanded by the English public.

The more reactive the coke, the more readily does the reduction to carbon monoxide take place, without the need for an especially deep fuel bed. One obvious effect of this is to allow the reactive coke to burn with a lower draught than would be necessary for an unreactive fuel, with a correspondingly deeper fuel bed.

Generally, low-temperature cokes give higher reactivities than the high-temperature fuel, although this is not an invariable rule. The material from which the coke has been made is of first importance. The easy coking coals generally produce unreactive, and the poorly coking coals relatively reactive, coke. The time of carbonization is of importance, as prolonged heating over 700° C. is considered to thicken the cell structure of the coke, rendering it less reactive. This is in addition to the reduction of volatile matter content, consequent upon prolonged heating. A great deal more information is needed on the effect of varying conditions in manufacture governing the reactivity of coke than is at present available.

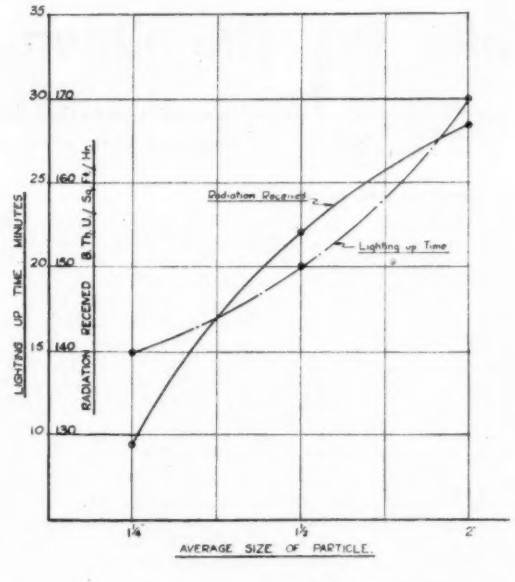
Volatile Matter.

The completeness of carbonization, on which the quantity of volatile matter remaining in the coke depends, is one of the most important factors in the satisfactory burning of coke in the open grate. Generally speaking, when increasing the volatile matter, the lighting-up time is reduced, flexibility is increased, and the high volatile coke has the flaming characteristic, which is considered by many to give it an advantage in appearance.

The disadvantage of leaving a small percentage (1%) of volatile matter is that the thermal yield is lowered. This may be overcome by steaming, which, while increasing the yield, will not necessarily drive off the last traces of hydrocarbons from the coke.

Size of Coke.

Careful experiments have shown that the most suitable size of coke for the open grate is that between 1 in. and



3 in. There is no doubt that a size more near 1 in. is better for lighting, while the larger sizes give a higher proportion of radiant heat after they have been alight for an hour. Coke smaller than 1 in. does not give any improvement on the lighting time, owing to its tendency to clog the grate bars, and to restrict the supply of air, while it has a serious effect on the radiation emission of the fire once it is alight. Large coke, on the other hand, while increasing the period of lighting-up, improves the

radiant efficiency of the fire considerably. This is illustrated by the following tables:

The Effect of Size on the Ease of Ignition of Coke.

Size of Coke.	Lighting Up Time.
In.	Min.
1½–2	30
1 –2½	30
1 –2	20
1 –1½	15
1 – 2 (containing 25% ½ in.–1 in.)	35

The Effect of Grade of Coke on Heat Emission from an Open Fire.

Grade of Coke.	Coke Consumed.	Radiation Received.*	Radiation Received.†
In.	Lb./Hr.	B.Th.U./Sq.Ft./Hr.	B.Th.U./ q.Ft./Lb.
1 –3	4·2	167	39·7
1 –2	3·9	154	39·8
½–2	3·7	129	35·2

* Radiation measured at a horizontal distance from the fire of 4 ft., and a vertical distance above the fire of 3 ft. 6 in.

The effect of size on coke in heat radiation from the fire may be illustrated by the graph, from which it will be seen that the two larger sizes, 1¼ in. to 2 in., give a higher degree of radiation than the smaller variety. It is also interesting to note that the normal fluctuation in the size and shape of coke in a 1 in. to 2 in. grade does not have any noticeable effect on the fire, and it is this grade—*i.e.*, 1 in. to 2 in., which gives the most satisfactory results, having regard to all conditions.

Bulk Density.

Generally speaking, light coke will ignite more easily, give a bright fire more quickly, and give more flexible operation. The dense coke gives a higher degree of radiation from the fire, and is capable of a higher intensity of combustion, and therefore a hotter fire, and the fuel needs replenishing less frequently.

The denser coke is more susceptible to fluctuations in the grade and in sizing, and care must be taken to keep this between the limits of 1 in. and 2 in. Among the denser cokes would be the intermittent vertical and horizontal retorts, and, in the lighter group, continuous vertical coke.

The size of retort in which the coke is made may have a marked effect on the bulk density; the smaller the major axis dimension, the lighter the coke, and the better its performance in the open grate. Continuous vertical retorts may vary from 33 in. to over 100 in. in major axis, and tests on samples from varying sized retorts, while giving the same critical air blast, have shown a marked difference in performance in favour of the narrow retort.

Ash Content.

High ash content is a serious objection to the use of solid fuels. In the first place the consumer actually obtains a reduced quantity of combustibles and objects to paying for purely waste material. The ash is a source of dust in the room, and the removal of the ash causes inconvenience and extra labour. It also hinders radiation of heat from the burning fuel into the room.

The chief disadvantage of all is the need for continual shaking or disturbing the fire to remove the layer of ash which forms over the surface of the fuel and impedes air supplies and combustion. These objections to ash apply more to the coke with a light friable ash which is evenly distributed throughout the fuel. The heavy ash, on the other hand, or ash which is segregated, possibly as shale, falls away more easily from the burning fuel. Heavy ash is frequently due to the presence of iron oxide as a constituent.

Iron oxide also results in an ash of higher fusibility, and, although of importance to the enclosed stove, does not concern the open grate in which the temperature of the fuel bed is rarely high enough to cause clinker.

Brian Hodgemans has shown that high ash content will impair the radiation efficiencies of the coke. Thus, two dry cokes of 1½ to 5½% ash content have given radiation efficiencies of 29% and 25% respectively.

Type of Ash.

While a high ash content by weight is a decided disadvantage, far more serious is the presence of a light friable ash; in other words, a coke with a high ash volume. Thus, a coke which is made from a coal crushed before carbonization in which the mineral matter has become thoroughly mixed, giving a light flocculent ash, gives much less radiation, and also a dull appearance in the grate. On the other hand, coal which has not been crushed leaves the ash segregated, and it easily falls away from the coke during combustion. Shale may also be removed more easily by dry cleaning the coke after carbonization by such methods as air flotations. Shale, however, which is left in the coke, may explode, especially if it is of the laminated variety. This behaviour of shale is due to moisture, which, on heating, vaporizes with sufficient rapidity to cause an explosion. Experience in the supply to the public of cokes which vary because they come from a number of different works has borne out the theory that coke which gives the most satisfaction in the open fire is made from coals which have not been crushed before carbonization.

Moisture in Coke.

The effect of moisture on the ease of ignition is shown in the table set out, and it will be seen that up to 3% the effect is negligible, while 5% of moisture and over materially lengthens the time of ignition. The quantity of radiation and efficiency of radiation are also affected adversely by quantities above 8%, but little effect is noticed below this percentage.

The effect of moisture on radiant efficiency may be serious, as the tests by Dr. Fishenden show:

Moisture	2	..	8	..	21
Radiant efficiency . .	28·7	..	26·0	..	24·4

The loss in efficiency is more than can be explained by the lower net weight of dry coke in the moist sample *plus* the heat taken to evaporate the moisture. It is probable that the water gas reaction is involved and that some of the carbon monoxide is not effectively consumed, or that it is consumed in such a manner that the radiation from the hot gases is reduced.

The presence of moisture of about 25% to 30% does not appear to affect the rate at which the fuel will burn, and it is probable that the water gas reaction $H_2O + CO + H_2$ assists in promoting the consumption of coke. A small quantity of moisture up to, say, 3% materially reduces the possibility of dustiness in the coke. The dust problem may be very serious in a household when handling practically dry coke. Dry coke burns quickly, whereas the presence of moisture gives a cracking noise in combustion, particularly on the addition of fresh supplies of fuel, which some find objectionable.

The Effect of Moisture on the Ease of Ignition of Coke.

Moisture.	Lighting Time.	Radiation After One Hour.
%		B.Th.U./Sq.Ft./Hr.
0	20	77·3
3	20	71·4
5	25	57·5
9	45	51·6

Absence of Noise in Burning.

The crackling noise made when a fuel burns is supposed by some to be a disadvantage, but by no means a serious one. It may be due to two results: (*a*) moisture, which, on warming, is expelled with expressive violence, or (*b*) the structure of the coke being strained in the carbonization of coal from the plastic state, and re-heating may cause cracking of the structure. The effect of moisture is clearly shown by the observation of dry quenched coke, which shows practically no sign of crackling.

Comparison of Coke with Coal and Semi-Coke, &c.

The following table, compiled from the results of Dr. Fishenden, shows radiation efficiency and general flexibility:

—	Coal.	Anthracite.	Coke.	Semi-Coke.	Briquettes.
Radiant efficiency .	24	27	28	33	19
Time to reach full heat output, min.	80–140	100	160	90	100
Output when left unattended for 3 hours, % maximum output . .	60	70	40	60	..

The very great increase in radiant heat output of coke compared with coal, coupled with its low price, makes coke easily the cheapest fuel for the open grate. The longer time taken to reach maximum output and the more rapid dying away when left are indicative of the slightly increased amount of attention required by coke.

The distribution of heat to a room is not affected by change from one fuel to another for similar grates.

Treatment to Improve Ignitability of Coke.

As distinct from coal treatment, prior to carbonization, coke may be treated itself to improve the ignitability and general combustion, and the best known method is to attach a skin of coal dust by means of pitch or tar as adhesive.

Some results obtained by F. Bell and H. L. Hodsman from various types of coke, with and without treatment, are given in the table showing the radiation at various times. In all cases, marked reduction in gas required for lighting-up is shown, and in almost every case there is a marked increase in radiant efficiency.

Treatment with sodium carbonate has an effect of increasing the ignitability and combustibility of coke, but slightly reduces the radiant efficiency.

*Table Showing the Results Obtained by Treating Coke with a Mixture of Bituminous Coal and Tar, the Increased Ignitability, and Intensity of Radiation.**

Type of Fuel.	Gas Used for Lighting.		B.Th.U. Radiated per Sq.Ft. per Hour. 90 Min. After Lighting Fire.	
	Treated.	Untreated.	Treated.	Untreated.
Continuous vertical coke .	8	15	465	375
Horizontal coke	12	22	269	165
Coke oven	12	17	373	399
Intermittent vertical coke .	17	27	275	177

* Taken from The Institution of Gas Engineers' Communication No. 80. November, 1933.

The Production of Special Cokes.

The problem of the production of the most suitable type of coke for use in the open grate is complicated because other factors, such as yield and quality of gas, cost of grading, and so forth, have to be taken into account.

Summary.

To summarize, the type of coke is affected by the following factors:

1. The coal used, particularly its ash content, type of ash, and coking qualities. The superiority of Yorkshire coal over Durham has been clearly demonstrated, although it involved a considerable addition to the cost of coal.
2. The time of carbonization, with which must be coupled the thermal yield of the coal and the amount of steaming. Steaming may be so arranged to generate water gas without driving off the last traces of hydrocarbons from the coke, and thus leave sufficient volatile matter to ensure the success of the fuel in the open grate.
3. The type and shape of the retort mentioned previously, and the method of carbonization, whether continuous or intermittent.

WESTERN JUNIOR GAS ASSOCIATION

THE PRESIDENT.

J. H. DYDE, M.Sc.

Mr. J. H. Dyde was educated at Scarborough and at Leeds University, where he graduated in the Department of Pure Chemistry and later of Gas Engineering. In January, 1928, he was appointed Technical Assistant to the Plymouth and Stonehouse Gas Light and Coke Company. He was awarded M.Sc. degree by Research Thesis in 1929, and gained a Diploma in Gas Engineering of The Institution of Gas Engineers, 1st Class with distinction, in 1932, and with it the Charles Hunt Memorial Medal. Mr. Dyde was appointed Sales and Technical Superintendent to the Plymouth Company in 1932, which position he still holds.

Presidential Address

OF

J. H. DYDE, M.Sc.

(Sales and Technical Superintendent of the Plymouth and Stonehouse Gas Light and Coke Company)

"The Marketing of Gas Consuming Appliances"

Presented at a meeting of the Association held at Plymouth on Saturday, April 25.

At no time in the history of the Gas Industry can be found a period like the past ten years in which gas consuming appliances have made such rapid strides in technical efficiency, efficacy, design, and finish.

The stimulating influence of increasing competition in the fields in which our commodity is used has been largely, but not wholly, responsible for this active progression. The boom in building, for instance, has been an important influencing factor, for it has created new opportunities for inventive genius and has given rise to conditions which demanded changes—particularly in the appearance of gas appliances if they were to continue to take their place in the modern home.

Fashions, tastes, change with startling rapidity nowadays, and it is necessary for gas appliances to change in conformity. The black cooker with its ornate castings and brass fittings has been superseded by the enamelled cooker with its plain, easily cleaned surfaces, its chromium-plated fittings, and its automatic oven-heat controller. To-day we are scrapping black cookers, to-morrow we shall be scrapping enamelled cookers, to give place to what? It is interesting to speculate upon the lines of future development. In spite of the recent improvement in the quality and appearance of the enamel finishes, the general outline and design of the present-day cooker remain much the same as it was years ago.

Several manufacturers, realizing the need for change to conform with modern kitchen planning, have at last broken away from the conventional design, and it is certain that we shall see developments on somewhat similar lines to those of our American friends.

With regard to the detail of design, the cooker hotplate of the future must provide facilities for still easier cleaning and present a surface which tends to the freer manipulation of utensils; moreover, catering for the convenience of the user, all taps will be self-lighting. There is a definite need on most present-day cookers for a more powerful boiling burner, and also for an improvement in the general design and efficiency of the griller.

The greatest obstacle to the development not merely of the gas cooker but of gas appliances generally, is the presence of sulphur in the gas distributed for use. In the absence of an economic process for complete sulphur removal we must develop the use of sulphuric acid resisting surfaces and alloys to a far greater extent in the construction of appliances.

Taking appliances generally, there is room enough for improvement and an unlimited field for prospection. Appliance development to-day is largely in the hands of a relatively small number of manufacturers, who maintain their own research and technical staff, and while at the

moment there is little cause for complaint, one feels that the future would be more secure if the Industry could support an appliance research development centre of its own on the lines of that now run independently by the Gas Light and Coke Company. Any patents taken out could be released to reputable firms, who would be entrusted with their application to their own manufactured goods.

At the present time it would appear that gas undertakings of even moderate size submit appliances to some form of test before introducing them into their lists for selling or hiring to the public. There is little uniformity in the method of testing devised by one undertaking and another, but as the *modus operandi* in individual undertakings is standard, results are obtained which are of value to any particular undertaking but of little value to others whose standard is different. The advantages of a central bureau which would set its seal on an appliance as conforming with specified combustion characteristics and thermal efficiency are obvious.

At Plymouth we test new appliances for thermal efficiency where possible, and for their ability to withstand overload conditions. All cookers are subject to practical cooking tests, which include bread baking, trays of smalls, and roasting. Providing an appliance has a reasonably high thermal efficiency and will take an overload—and many cheap and indifferently made appliances can claim these advantages—the deciding factor is a durability test. These tests are particularly useful in assessing the value of water heaters, and the process consists of placing the heater under very heavy duty for three months, observing its performance, and then stripping and examining the degree of corrosion on the various parts. Information of this nature is of the utmost value to an undertaking's buyer. It must be emphasized that, however rigid may be a laboratory examination and testing, it is district experience that puts the final hall-mark on an appliance.

Marketing Policy.

Several years ago the Company I serve gave me the opportunity, when I became associated with the commercial side of the Industry, to visit a number of the leading gas undertakings and gain some insight into the selling policies that were being pursued.

It was very pleasing to find at every turn a willingness to assist and give any information that was desired, and I may say that much of the information gleaned has subsequently been of great value to me, and, I venture to suggest, to the Company. I was, nevertheless, considerably perplexed by the many divergent views that were expressed and the general lack of uniformity in the methods adopted for the marketing of appliances.

It was quickly apparent that local conditions had a decided influence on the framing of policy and accounted satisfactorily for certain divergencies, but there remained many anomalies on major points of policy which defied explanation.

Let us examine a number of the more important of these controversial points.

(1) *Margin of Profit.*

What margin of profit, if any, should be placed on the net cost of an appliance to arrive at its cash selling price?

In deciding this issue consideration must be given to a variety of conditions, some of which are inter-related and inter-dependent.

In the first place, it has to be decided whether it is to be the policy of the gas undertaking to undercut all local dealing and virtually gain a monopoly, or whether prices are to be maintained at such a level as to permit local ironmongers and builders' merchants to participate in the sale of gas appliances.

Assuming that a gas undertaking decides to exert control on the selling of appliances, there is still the following viewpoint worthy of consideration—namely, should the price of gas be called upon to carry all or part of the high cost of the establishment and maintenance of showrooms, sales staff, and advertising? With ever-increasing competition and the necessity for greater expenditure in almost every department in order to maintain existing business and secure new, surely it is reasonable to suppose that the appliances themselves should bear a proportionate share of these charges.

Some undertakings prefer to maintain a relatively high price for gas and almost give away appliances, making further concessions in fixing charges; others obtain a full makers' list price of all appliances, charge in full for all installation work, and give better terms for their commodity. It would appear reasonable to suppose that a middle course between these extremes of policy would be the wisest and most remunerative to pursue.

There is no doubt whatever that attractive terms encourage the sale of appliances, but with the aid of the extended purchase system a fair margin of profit can still be allowed without appreciably affecting the attractiveness of these terms.

It is the writer's view that co-operation with local dealers should be encouraged, for collectively they represent a powerful organization from whose association we could reap much benefit.

The ironmongers have their own clientele among our consumers, and the builders' merchants have a more direct contact and influence on builders than we have, and both bodies can therefore do much to forward our interests if it is worth their while.

(2) *Dealer Co-operation.*

In Plymouth we have recently introduced a co-operative scheme to approved dealers in our area of supply, much on the lines of that operated by the Gas Light and Coke Company.

Briefly, the scheme demands of a dealer that he should provide an adequate display space in his showrooms for gas appliances. In return the Company agrees to supply a range of equipment and allows the dealer a very reasonable commission on all orders taken, whether they be for cash or on hire-purchase terms. Further, there are commissions for introducing customers to our own showrooms to make a purchase when they have been unable to complete the transaction themselves, and also commissions for transacting hiring agreements. Where our terms include installation charges commissions are paid on the whole.

It will be seen that the dealer incurs neither capital expenditure nor business risk, and as a consequence is satisfied to accept as commission a lower percentage than he would want were he financing and selling the article himself. Moreover, the sale—either direct or under extended purchase terms—of high-grade appliances would not only be of financial advantage to the dealer, but would exclude the sale of much of the cheap and shoddy types of appliance which have been a source of trouble in the past.

It will be realized that gas undertakings which have ruthlessly cut their profit-taking have not the margin to allow of this co-operative selling, unless they either increase their own terms all round or are prepared to carry a loss on appliances sold by approved dealers simply to secure their goodwill.

Returning to our own local venture, it is early days yet to foresee the extent to which this co-operative selling will develop, but it is not anticipated that the dealer sales will unduly diminish the takings at the Company's showrooms.

Presented from another aspect, dealer co-operation might be well worthy of consideration in the following circumstances. Supposing an undertaking is considering the opening of a district showroom, as an alternative may it not prove more remunerative and as effective to come to terms with a reputable dealer in that district? It may be necessary to sacrifice all profit on the appliances, save perhaps a little to cover handling charges, in order to give a commission high enough to make the matter worth while to the dealer, but offset aginst this would be the capital and maintenance charges of a new showroom, which would require a large turnover to cover.

It will be gathered from the foregoing remarks that the writer is of opinion that a fair margin of profit should be retained on all appliances for sale to domestic consumers.

In dealing directly with builders it is necessary to give trade discount, increasing in amount with quantity orders. We have experienced considerable difficulty in inducing builders to buy better-class appliances. Particularly is this the case with water heaters; but once the resistance was broken down the builder quickly appreciated that the superior fittings more than compensated for their extra cost by enhancing the selling value of the houses.

We have found repeatedly that where we have introduced to builders new and good quality water heaters and built-in gas fires, and taken their first orders, they have subsequently continued to install these appliances, but have purchased them from the builders' merchants. The reason for this is not as a general rule that they can get better purchase terms from the merchants, but because they already have big accounts with these people and are given very long term credits which we, for our part, are not prepared to extend.

We do not object to this arrangement, nor do we cut prices to hold this business from the merchants; our satisfaction lies in the knowledge that appliances of a type that are a credit to the Industry are being fitted, and that the consumer will get a satisfactory service from the use of our commodity.

(*To be continued.*)

New Glover-West Vertical Retort Plant at Slough

An installation of twelve 50/56 in. vertical retorts producing 2 million cu.ft. per diem on the same ground space originally occupied by plant producing only about 500,000 cu.ft.

Early in the nineteenth century the first gas-works built in Slough was situated in Chandos Street, and the Undertaking was then probably in the hands of private individuals. The earliest records of a Gas Company are dated 1818, and an Act of Incorporation was obtained in 1866. The present site in the Uxbridge Road was purchased in 1898, and a gasholder was erected upon it, taking its supply from the Chandos Street Works.

In the year 1902 a new Works was built on the new site, and gas-making was commenced in July, 1903, with plant of a capacity of 250,000 cu.ft. per day. For about ten years the two works were run in parallel, but in 1911 the old plant was closed down and demolished, and it is interesting to note that the original retort house and coal store are now converted into a billiard hall. The Uxbridge Road site was extended by the purchase of additional land in 1917, and the total area of the works is now about 9¼ acres.

The area supplied by the Undertaking extends over some 30 square miles and includes Slough, Langley, Datchet, Farnham Royal, Farnham Common, and Cippenham, served by approximately 70 miles of mains.

The growth of the demand for gas during recent years has been phenomenal, due, in the main, to the development of industry in Slough, and the consequent growth of population. In 1911 the population of Slough was 14,985, and this had risen to 16,397 by 1921. In 1920 the urban boundaries were extended, bringing the population up to 33,530 by 1931. The present population is in the region of 42,000. No doubt this development is due to the geographical position of Slough, situated as it is within 20 miles of London on the main Bath Road. A number of important factories have been recently established on the Slough Trade Estate, some two miles east of the town itself, where foodstuffs, paints, varnishes, wireless apparatus, small machinery, and other engineering products are manufactured.

The annual make of gas in 1911 was 68 millions. It rose to 146 millions in 1924, and the last annual return shows a make of 335 millions.

In addition to the carbonizing plant the works includes one set of R. & J. Dempster's carburetted water gas plant of the back-run type, capable of producing 250,000 cu.ft. per diem. There are two water-cooled condensers of a daily capacity of 2,000,000 cu.ft., two exhausters each capable of dealing daily with 2,000,000 cu.ft. and one of 750,000 cu.ft. capacity. There are two Livesey washers each of a daily capacity of 1,000,000 cu.ft. with a tower scrubber and a rotary washer of 2,000,000 cu.ft. daily capacity. The dry purification plant consists of eight boxes and one catch box. The station meter is of the Holmes-Connersville type, with a nominal daily capacity of 2·4 million cu.ft. The present storage capacity is 1,300,000 cu.ft., including a small holder on the district, but a 2,000,000 cu.ft. spiral-guided holder is now under construction by Messrs. R. & J. Dempster.

The carbonizing plant originally comprised four beds of inclined retorts in sixes, later extended to six beds, and it is in this retort house that the recent installation of twelve Glover-West 50 in./56 in. vertical retorts has been accommodated. Owing to the increasing demand for gas it was necessary to keep the three beds of inclines at work during part of the erection period, and the new plant has been built, and the alteration to the existing coal plant carried out, without interfering with the gas-making process.

Demolition of the discarded beds of inclined retorts was commenced on April 23, 1935. The first stanchion of the new installation was erected on July 1, and twenty weeks later gas-making was commenced.

The twelve vertical retorts are installed in half the inclined retort house, leaving room for a further twelve retorts as and when required. Thus, on the ground space originally occupied by plant making about 500,000 cu.ft. per day, it will be possible to install vertical retorts with a daily capacity of over 2,000,000 cu.ft.

The works is situated in a conspicuous position in full view of an important residential district, and great pains were taken with the design of the extension of the retort house building, particularly in the upward direction. The photograph here reproduced shows that the problem of providing a sightly housing for plant which is necessarily of more than ordinary height has been very satisfactorily solved.

Coal is brought to the retort house in railway wagons running on the works sidings and handled by a steam crane and steam winch. The coal is delivered to the vertical retort plant either from a previously existing elevator and pushplate conveyor, or from a previously existing elevator and band conveyor to the boot of a new elevator, which delivers it to a pushplate conveyor arranged over the coal-storage bunkers above the retort bench. By this arrangement the coal-handling facilities to the previously existing plant are not interfered with in any way, but in order to accomplish this some ingenuity was required in the design of the new elevator. This consists of a rapidly travelling band placed in a vertical position with buckets riveted to it. The band runs at a velocity of 275 ft. per minute, and the coal is projected from the buckets at the head to deliver clear into the conveyor above.

The twelve retorts are capable of producing easily a million cu.ft. of gas per day. The retorts are of the Glover-West patent "Key" design with panelled walls, with the materials "zoned" to suit the differing conditions throughout the length of the retort—and they are of the "steaming" model. They are arranged in six distinct beds containing two retorts each and heated by two producer-gas generators, each of sufficient capacity to pro-

vide fuel gas for six retorts, the two producers being interconnected so that either can supply fuel to any of the carbonizing units, and they are both equipped with steam-air injectors so that breeze can be used for under-firing as and when required. The retort bench is adequately insulated with the well-known " Dome " brick.

The coke extractor gear and the lift are steam-driven, the engines being accommodated in a separate room adjoining the retort house. The lift is capable of dealing with gross loads of one ton, and is used for handling coke to the producers and retorts. The engine house also contains the boiler feed and liquor pumps in addition to the extractor gear and lift engine.

The waste-heat recovery plant consists of a Spencer-Bonecourt induced-draught boiler capable of raising 3,700 lb. of steam per hour at a pressure of 120 lb. per sq.in. and superheated 50° F. The fan is turbine-driven, the exhaust steam being fed to the retorts.

The installation is very fully equipped with instruments for the technical control of all portions of the plant, including pressure indicators and recorders for the gas made, temperature and pressure indicators for the producers and producer-gas supply to the settings, water meter to the boiler, steam meter to the retort bench, with steam regulating valves to the individual retorts, pyrometers and draught indicators for the waste gases in and out of the boiler, and a revolution counter to record the operation of the coke extractor driving gear. H. W.

Distribution Load Factor and Gas Charges

by
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of the Huddersfield Gas Department

In a Paper before the Yorkshire Junior Gas Association on April 18, the Author provided information which he set out in the form of answers to two questions in The Institution of Gas Engineers Higher Grade Examination in Gas Supply, 1935, on the above two subjects.

Institution of Gas Engineers Higher Grade Examination in Gas Supply, 1935:

PART 1, QUESTION 1.—*Define what is meant by Load Factor in relation to the Gas Industry. How has the Load Factor changed in the past fifty years, and what change is likely in the future?*

PART 2, QUESTION 7.—*What do you understand by a Two-Part Tariff for the Sale of Gas?*

In this Paper I am endeavouring to put before you a collection of information taken from every available source and condensed into a suitable form to satisfy the two questions previously mentioned.

The figures in the load factor part of the Paper are taken from the Huddersfield Corporation Gas Department's records, but those in the gas charges section are hypothetical and are not taken from any undertaking's figures.

Load Factor.

The term distribution load factor in regard to gas distribution is bound up with the name of Mr. Stephen Lacey, the Senior Vice-President of the Institution of Gas Engineers, and I would strongly recommend members who are interested in this subject to read Mr. Lacey's work.

Electrical undertakings pay very marked attention to distribution load factor, but just as it is important to electrical undertakings, so it is to the gas undertakings, and I maintain that if we neglect this important factor we are missing out of the working of the distribution department a very vital part. We are all familiar with the trend of gas progress during the past ten years—the increased use of gas for heating, cooking, and water heating, and last but not least the vast increase in the use of gas for non-domestic purposes, and also a decrease in the use of gas for domestic lighting, and in some cases (owing to unfair competition) a decrease in the use of gas for public lighting. The older members of the Junior Associations will recall these changes in a smaller degree many years ago.

The result of the foregoing fluctuations in the gas output tends to level up the rate of output of gas from the works, or, to express it in another way, the average rate of output is steadily creeping up to the maximum rate of output. It will be clearly seen from this that the working and control of the carbonizing plant will be much more efficient and economical.

Load factor can be expressed as the ratio of the average rate delivery of gas to the maximum rate of delivery of gas. It is usually expressed as a percentage of the maximum. For example: An undertaking has an annual output of 1,000 million cu.ft. per annum, and a maximum hourly output during the year of 500,000 cu.ft.

$$\text{Then average hourly output is } \frac{1,000,000,000}{8,760} = 114,000 \text{ cu ft. approx.}$$

$$\text{Then load factor} = \frac{114,000}{500,000} \times 100 = 22{\cdot}8\%.$$

Take the case of an individual consumer; consumption 48,000 cu.ft. per annum, and maximum hourly consumption 100 cu.ft. per hour.

$$\text{Average hourly consumption} = \frac{48,000}{8,760} = 5{\cdot}5 \text{ cu.ft. per hour.}$$

$$\text{Then load factor} = \frac{5{\cdot}5}{100} \times 100 = 5{\cdot}5\%.$$

Note in the latter case the importance of the heating and water heating load, which would tend to bring up the average. Also the amount of capital lying idle during times of low consumption.

In 1894 almost the whole of our load was lighting, and since that date one can trace the progressive use for gas in other directions, cooking, heating, water heating, and non-domestic, and the progressive decrease in the use of gas for domestic lighting, until finally, in 1934, apart from the " camel's hump " on the maximum day of that year, there has been a distinct levelling up of the average consumption of gas as against the maximum both on the average winter and summer's day.

How has this improvement in load factor affected the Gas Industry in Huddersfield from an £ s. d. standpoint? Capital costs on mains and services are always a serious item to any gas undertaking. In 1894 the maximum 3-hourly output on the maximum day was 796,000 cu.ft.; in 1914 it was 820,000 cu.ft., and in 1934 was 907,000 cu.ft. The percentage increase in maximum 1894 to 1914 was 3% approximately; yet the percentage increase in annual output was 76% approximately, and similarly the percentage increase in maximum 1894 to 1934 was 14% approximately, yet the percentage in annual output was 124% approximately. Hence it is apparent that the distribution system of 1894 was capable of delivering in 1914 practically the whole of the increase—374,529,000 cu.ft. or 76%—and still further was capable of delivering in 1934 practically the whole of the increase—616,000,000 cu.ft. or 124%. This increased use of the distribution system has gradually brought down the capital cost of mains and services per 1,000 cu.ft. of gas sold, or in other words the revenue per mile of main has progressively increased.

How will the future development affect the distribution costs? A common idea is that if we increase our output

we shall be in a position to decrease the price of gas per 1,000 cu.ft. This is not correct in every case.

New estates are being developed rapidly, and by the Gas-Works Clauses Act of 1871 we are compelled to supply gas to premises if requested to do so and if the premises are within 25 yards of the Gas Undertaking's main. This, together with our moral obligation as a public service undertaking makes it binding upon us to lay mains to such estates and service the houses. The Minister of Health and the Municipal Authorities set down (and rightly so) that there shall be only so many houses per acre. Also modern houses are usually equipped with both gas and electricity.

These factors, together with the increased cost of materials and labour tend to increase the capital cost of mains and services per consumer, and therefore increases in gas consumption obtained by supplying such estates will not tend to reduce the price of gas.

For example, suppose cost of mains and services and meter to an estate (domestic) amounts to £10 per house. The annual charge for capital (mains, services, and meter) at 5% interest and 5% depreciation amounts to 20s. per annum.

Suppose the gas consumption per house is 15,000 cu.ft. per annum, and the maximum consumption is 30 cu.ft. per hour.

Then the capital charge will be $\frac{20}{15} = 1{\cdot}33$s. per 1,000 cu.ft.

Average hourly consumption: $\frac{15{,}000}{8{,}760} = 1{\cdot}71$ cu.ft. per hour approx.

Then load factor $= \frac{1{\cdot}71}{30} \times 100 = 5{\cdot}7\%$.

Thus it will be seen that distribution load factor and capital charges on mains and services have a relationship. Increased load factor decreases the capital charges on mains and services per 1,000 cu.ft. of gas sold and *vice-versa*.

If we cannot depend upon new estates, what hopes have we of further reducing the price of gas? Assuming that we have got down to rock-bottom net gas into holder sold, our salvation lies in making increased use of the mains in old areas of supply by non-domestic or increased domestic consumption, and this will tend to balance the high capital costs per 1,000 cu.ft. of gas sold in the new estates.

Gas Charges.

Before considering methods of charging for gas such as step rates or two-part charges, it is necessary first of all to analyse the various costs of manufacture, distribution, and administration sides of the undertaking, and thus arrive at a figure per 1,000 cu.ft. of gas sold, which, plus a margin for emergencies and contingencies fund, must be the basic charge for gas.

It is at this stage that a system of charges can be considered. There are standing charges which alter very little irrespective of the amount of gas sold, such as office expenses, cost of meter inspection, showroom expenses, cost of maintenance of mains and services, rates and taxes, &c. In view of this it would appear that the flat rate of charging for gas is very unfair. For example; let us consider these fixed charges at 1s. per 1,000 cu.ft. Is it fair that the consumer who burns 10,000 cu.ft. of gas should contribute 10 by 1s. = 10s. towards standing charges, while the man who only burns 1,000 cu.ft. pays only 1s.?

Take the case of meter inspection. In the case of "A" gas undertaking it was 1·098d. per 1,000 cu.ft. of gas sold. Then the man who burns 10,000 cu.ft. pays 10·98d. for having his meter read, and the man who burns only 1,000 cu.ft. pays only 1·098d. Yet it costs the gas undertaking just as much to read the meter of the former as it does the latter.

In other words, the large consumer is subsidizing the small consumer, who may be his next-door neighbour. When a system of charges is adopted the consumer knows that he is only paying for services and commodity which he gets.

Much criticism might be levelled at a system of charges, and the opinion expressed repeatedly that the poor consumer was being made to suffer, in that the small consumer must of necessity be the poor consumer. In nearly all cases this has proved to be untrue, and we have a concrete instance in Huddersfield.

What, then, are the advantages to be gained from a system of charges as compared with the flat rate?

(1) Except for prepayment consumers, who pay an additional charge, all consumers are charged on the same basis.

(2) Special rates and discounts for certain types of consumers are not necessary.

(3) After the standing charges have been paid, gas is sold at a low rate.

(4) Reductions in price are more impressive to the consumer.

(5) The consumer will know that he is contributing in correct proportion for the delivery of his gas.

Let us consider two methods of charge.

(1) Two-Part Tariff:
  (*a*) First part being a fixed service charge.
  (*b*) Second part being a gas charge considerably lower than the flat rate.

(2) Step Rates: Where the initial steps contain a concealed fixed charge.

Having decided to go on to an equitable system of charges, we must make an analysis of Table I.

TABLE I.

"A" Gas Undertaking—
Make of gas, 444,000,000.
Output, 400,000,000 (500 B.Th.U. per cu.ft.).
Unaccounted for gas, approximately 10%.
Coal carbonized, 25,000 tons.

—	—	Cost per Ton of Coal.	Cost per 1,000 Cu.Ft. Sold.
	£	s.	d.
Manufacture—			
Coal, oil, elect. for power	25,000	20·000	15·000
Less receipts from residuals, coke, tar, sulphate of ammonia, benzole	15 000	12·000	9·000
Net cost of coal	10,000	8·000	6·000
Purification, *less* sp. ox.	500	0·400	0·300
Salaries	1,000	0·800	0·600
Wages, national health, unemployment	8,000	6·400	4·800
Repairs and maintenance of plant	3,500	2·800	2·100
Net holder sold	23,000	18·400	13·800
Distribution—			
Wages, material, *less* fittings sold and work paid for	17,500	14·000	10·500
Stove rents and hire purchase receipts	3,500	2·800	2·100
	14,000	11·200	8·400
Meter inspection	1,830	1·464	1·098
Rents, rates, and taxes	4,000	3·200	2·400
Salaries	2,000	1·600	1·200
Misc. stationery, &c.	2,000	1·600	1·200
Bad debts	125	0·100	0·075
Sinking fund charges or dividend	7,500	6·000	4·500
	17,455	13·964	10·473
	54,455	43·564	32·673

Thus it would be possible for "A" Gas Undertaking to sell gas on a flat rate of 2s. 8·673d. per 1,000 cu.ft. and plus a small margin of profit for an emergency and contingency fund, say, £2,500, which works out at 2·5d. per 1,000 cu.ft. sold.

∴ Actual flat rate 34·173d. or 2s. 10·173d. or 2s. 11d. per 1,000 cu.ft.

TABLE II.—*Analysis of Table I. Showing Manufacture and Distribution Charges in Proportion.*

MANUFACTURE.	£	Pence per 1,000 C.Ft. Sold.	DISTRIBUTION.	£	Pence per 1,000 Cu.Ft. Sold.
Net holder sold	23,000	13 80	Distribution	14,000	8·400
Rents, rates, and taxes, 60%	2,400	1·44	Rents, rates, and taxes, 40%	1,600	0·960
Miscellaneous, 40%	800	0·48	Miscellaneous, 60%	1,200	0·720
Sinking fund charges, 60%	4,500	2·70	Sinking fund charges, 40%	3,000	1·800
			Bad debts	125	0·075
			Meter inspection	1,830	1·098
			Salaries	2,000	1·200
	£30,700	18·42		£23,755	14·253

Average price to be obtained 32·673 *plus* 1·5 = 34·173d. per 1,000 cu.ft. sold.

From Table II we get the fixed manufacturing charge to all types of consumers, but it is necessary to analyse further the distribution charges in order to get both Domestic and Non-Domestic Charges in fair proportion.

TABLE III.—*Analysis of Table II. Showing Domestic and Non Domestic Charges in Proportion.*

DOMESTIC		NON-DOMESTIC.	
Assume 20,000 consumers.		Assume 500 consumers.	
Consumption, 320,000,000 cu.ft. per annum.		Consumption, 80,000,000 cu.ft. per annum.	
Average per consumer per annum, 16,000 cu.ft.		Average per consumer per annum, 160,000 cu.ft.	
	£		£
Distribution, 90%	12,600·0	Distribution, 10%	1,400·0
Meter inspection, 95%	1,738·5	Meter inspection, 5%	91·5
Miscellaneous, Salaries, Rents, rates, and taxes, Bad debts, Sinking fund (80% rate of gas output)	6,340·0	Miscellaneous, Salaries, Rents, rates, and taxes, Bad debts, Sinking fund (20 %)	1,585·0
	£20,678·5		£3,076·5
Emergencies and contingencies, 80%	2,000·0	Emergencies and contingencies, 20%	500·0
	£22,678·5		£3 576 5
= 17·01d. per 1,000 cu.ft. approx.		= 10·73d. per 1,000 cu.ft. approx.	

Average price to be obtained over :

Domestic Scale.	Non-Domestic Scale.
17·01	10·73
18·42	18·42
35·43d. per 1,000 cu.ft.	29·15d. per 1,000 cu.ft.

TABLE IV.—*Fixed Service Charges.*

TWO-PART TARIFF.

DOMESTIC.	NON-DOMESTIC.
£22,678·5	£3,576·5
Number of consumers, 20,000	Number of consumers, 500
Cost per consumer per annum 22,678·5 / 20,000	Cost per consumer per annum 3,576·5 / 500
= £1·133925	= £7·153
= £1 2s. 8d approx.	= £7 3s. approx.

There appears to be a big difference between the fixed service charge for domestic and non-domestic scale, but when this is worked back to the average cost per consumer per 1,000 cu.ft. the true comparison can be plainly seen.

£1 2s. 8d. / 16 = 17·0d. approx.	£7 3s 0d. / 160 = 10·72d. approx.
Service charge to consumer, £1 2s. 8d. per annum.	Service charge to consumer, £7 3s. per annum
Gas charge for all consumption, 1s. 6·42d. per 1,000 cu.ft.	Gas charge for all consumption, 1s. 6·42d. per 1,000 cu ft.

TABLE V.—*Domestic.*

STEP RATES.

(*a*) Suggested Steps—1. Up to 4,000 cu.ft. per annum
2. 4,000 cu.ft. to 12,000 cu.ft. per annum
3. 12,000 ,, to 20,000 ,, ,,
4. Over 20,000 cu ft. per annum

(*b*) Summary of Sales—

Consumers	Average Consumption per Consumer per Annum. Cu.Ft.	Total. Cu.Ft.
2,000	2,000	4,000,000
5,000	8,000	40,000,000
11,000	16,000	176,000,000
2,000	50,000	100,000,000
		320,000,000

(*c*) Then

	Cu.Ft. per Annum.	Cu.Ft.
20,000	consume 2,000	40,000,000
18,000	,, 6,000	108,000,000
13,000	,, 8,000	104,000,000
2,000	,, 34,000	68,000,000
		320 000,000

(*d*) Based on Scales—

Consumers.		Cu.Ft. per Annum.	Cu.Ft.		
2,000	at	2,000	4,000,000		
18,000	fixed minimum	4,000	72,000,000	1st step	76,000,000
5,000	at	4,000	20,000,000		
13,000	fixed minimum	8,000	104,000,000	2nd step	124,000,000
11,000	at	4,000	44,000,000		
2,000	fixed minimum	8,000	16,000,000	3rd step	60,000,000
2,000	at	30,000	60,000,000	4th step	60,000,000
					320,000,000

(*e*) Service Charge to be obtained, 17·01d. per 1,000 cu.ft. gas sold (Table III.).

Let the 4 steps = $w \cdot x \cdot y \cdot z$.

Then $\frac{w + x + y + z}{4} = 17{\cdot}01$

$w + x + y + z = 68{\cdot}04$.

In proportions of consumption we get from Table V. (*c*)—

$2 \cdot 6 \cdot 8 \cdot 34 = 50$ parts.

$\therefore$ 1 part $= \frac{68{\cdot}04}{50} = 1{\cdot}3608$d.

Service Charge.	Manufacture Charge (Table II.).	Per 1,000 Cu Ft.	
		s. d.	
1·3608 × 34 = 46·2672	+ 18·4200 = 64·6872	= 5 5	. . 1st step
1·3608 × 8 = 10·8864	+ 18·4200 = 29·3064	= 2 5	. . 2nd ,,
1·3608 × 6 = 8·1648	+ 18·4200 = 26·5848	= 2 3	. . 3rd ,,
1·3608 × 2 = 2·7216	+ 18·4200 = 21·1416	= 1 9	. . 4th ,,

(*f*) Step Scale of Charges (per quarter)—

	s. d.	
First 1,000 cu ft.	5 5	per 1,000 cu ft.
Next 2,000 ,,	3 5	,, ,,
Next 2,000 ,,	2 3	,, ,,
All over 5,000 ,,	1 9	,, ,,

(*g*) Financial Return at Scale Rates—

	s. d.		£ s. d.
76,000,000 cu.ft. at	5 5	per 1,000 cu.ft.	20 583 6 8
124,000,000 ,,	2 5	,, ,,	14,983 6 8
60,000,000 ,,	2 3	,, ,,	6,750 0 0
60 000,000 ,,	1 9	,, ,,	5,250 0 0
320,000,000 cu.ft.			£47.566 13 4

(*h*) At Flat Rate (Table III.) Domestic—

320,000,000 cu.ft. at 35·43d. per 1,000 cu.ft. . . £47,240

The non-domestic scale can be analyzed in the same manner.

Table V (*e*) shows a scale of charges which, if not suitable in themselves, form a basis for the making of a suitable scale of charges.

Discussion

The PRESIDENT (Mr. J. W. Carlton, Shipley) opened the discussion by pointing out that costs were not dependent on gas consumed. In Shipley every consumer cost the Undertaking £2 per annum for mains and services alone, and in many instances there were people who only used gas as a standby, and these complained most about their accounts; he enquired as to the best way of dealing with slot consumers of this description.

Mr. A. W. ELLIOTT (Elland) asked how change over from flat rate could best be carried out. If there was an increase to the small consumer the tendency might be to discontinue using gas.

Mr. W. BAILEY (Spenborough) enquired which was the best method—sliding scale, block, or two-part tariff.

Mr. E. R. B. FRENCH (Leeds) asked if there was any recognized charge to builders on new estates. Moreover, if there was already a standing charge for electricity, could one expect to get another for gas?

Mr. V. J. SIDDONS (Barnsley) observed that the Gas Industry had been built up by small consumers, and suggested that they could be too drastic in taking action against them.

Mr. FRENCH said that meter rents made a considerable difference to distribution charges, and many undertakings found it an advantage to make a charge.

Mr. J. W. WOOD (Leeds) asked if Mr. Thorpe had deliberately made no mention of special fixed charges for special cases. If an undertaking were solvent and seeking new business, special terms could be offered as an inducement. He knew of an undertaking on the Continent which had 32 scales. The Paper was sound and scientific, but consumers were in many cases neither sound nor scientific; they compared prices in other towns and cities, and it was often necessary for undertakings to camouflage their charges to make them look attractive.

The Author's Reply.

Mr. THORPE, in reply, said that electricity charges were not scientific, and he thought the various scales adopted by gas undertakings were more equitable whether they be step rates or two-part tariffs. He had endeavoured to illustrate the fundamentals of gas charges by giving rock bottom facts. He thought the two-part tariff was the soundest method because it was not compulsory and each consumer bore his own share. Meter rents should be charged; the revenue would help to reduce price of gas. There were no difficulties of note and figures could be manipulated to suit; consumers soon forgot standing charges. Charging by scales avoided the necessity for special discounts.

In reply to Mr. French, Mr. Thorpe stated that they made no charge to builders at Huddersfield for servicing, &c., and where a standing charge was made the scale could be adjusted. The retailer always expected to pay more than the wholesaler, and the small consumer should pay his quota of overheads. He agreed with Mr. French that meter rents brought in useful revenue. In conclusion, he stated that according to his figures, if a consumer paid 5s. 8d. per quarter and all gas at 1s. 6d. per 1,000 cu.ft. the same revenue was received.

Mr. C. A. NEWHAM (Leeds) proposed and Mr. L. R. COWLEY (Shipley) seconded the vote of thanks to Mr. Thorpe, while Mr. J. RICHMOND (York) and Mr. N. NELSON (Leeds) respectively proposed and seconded a vote of thanks to Mr. G. E. Currier and the Bradford Corporation Gas Department.

Colombo Gas and Water Company Limited

Annual General Meeting

The Annual General Meeting of the Shareholders of the Colombo Gas and Water Company, Ltd., was held at the Company's Offices, 148, Gresham House, Old Broad Street, E.C., on Monday, 20th April, 1936—Mr. ROBERT H. GLEN, F.C.A. (Chairman), presiding.

The SECRETARY (Mr. S. F. Field) read the notice convening the Meeting and the Auditor's Report.

The CHAIRMAN: Gentlemen, a copy of the Report and Statement of Accounts having been sent to all the Members, I will ask you to take them as read.

I referred at our last General Meeting on the 15th April, 1935, to signs of trade recovery in the Colony of Ceylon and I am pleased to here state that, although not large, a steady improvement was noticed throughout the year.

The export of Tea, Rubber and Coconut produce was less than the preceding year, owing to the working of the various quotas in force, but the revenue obtained therefrom was much more as a result of steadier and better prices.

It might be of interest to Shareholders to know that in February of last year Colombo was able to communicate by telephone with India, and ten months later Ceylon could speak to England by means of the international wireless telephone service. Another event of interest which occurred during 1935 was that Ceylon's first aerodrome began to take shape, a few miles south of Mount Lavinia. This aerodrome comprises a 240 acre site at Ratmalana; the first aeroplane to land there flew over from Madras in November last.

Turning now to the Accounts as before the Meeting, I will first briefly refer to the Additions to Capital, which amount to only £1,021 3s. 7d., being mostly in respect of the erection of a 12,000 gallon over-head Water Storage Tank and the purchase of additional Motor Vehicles.

The total Gas sold during the year was 264,532,600 cubic feet, an increase over the previous year of no less than 10,303,800 cubic feet, which is equivalent to 4·05 per cent.

Sixteen thousand nine hundred tons of Coal was carbonised, this figure being three hundred and ninety tons more than for year 1934. The Gas made per ton of Coal Carbonised was slightly more than in the previous year.

The Gas unaccounted for was 5·68 per cent. as compared with 5·63 per cent.

Working Expenses are higher by Rs. 29,867, which is mostly accounted for by our having sent to Colombo during the year an efficient Foreman to temporarily take the place of our Works Foreman who was on furlough and he, amongst other things, thoroughly overhauled the Company's Plant and Machinery in Colombo. It was also found necessary to send out a European Meter Mechanic to join our permanent Staff.

Wages for Fitting Work shew an increase of Rs. 1,539.

Legal Expenses amount to Rs. 440.32, or Rs. 485 less than the preceding year. I am also pleased to state that the figure in respect of Bad Debts is only Rs. 409.78.

The cost of Passages was Rs. 5,785.09, as compared with Rs. 4,591.96. More Assistants being on furlough during 1935 accounts for this small increase.

Depreciation of Stock and Motor Vehicles was about the same as for 1934, the respective figures being Rs. 55,625.14 and Rs. 54,952.23. We now have a fleet of five Lorries, which are kept constantly employed on our business, as well as Cars for the use of our outdoor European Staff.

The items for Fixing Cookers and Fixing Geysers are slightly higher than the previous year and I should like to here record that an additional 146 Geysers and Califonts and 41 Cookers have been fixed during the year, making a total of 1,641 Geysers and Califonts and 2,121 Cookers out in the Town as at 31st December, 1935.

Bonus to Local Staff and Workmen cost Rs. 23,980.29, which figure is about the same as in the preceding year.

Ceylon Income Tax amounts to Rs. 17,366.52. Dominion Income Tax relief is claimed here and proportionate relief from Tax on Dividends is made to our Shareholders.

On the Credit side of the Revenue Account Gas Rentals at Rs. 648,039.54 shews an increase of Rs. 9,900, which is in respect of the larger quantity of Gas Sold. Discounts to our larger consumers were increased as from 1st January, 1935, and this explains why the increased revenue is not larger.

Meter Rentals is about the same as for the previous year.

Receipts from Residual Products is less by Rs. 11,998.

389¾ tons more Coke was sold, but owing to the very poor demand, the average price obtained was slightly over Rs. 2 per ton less as compared with the previous year.

The Revenue from Tar shewed an increase of Rs. 868.09, and

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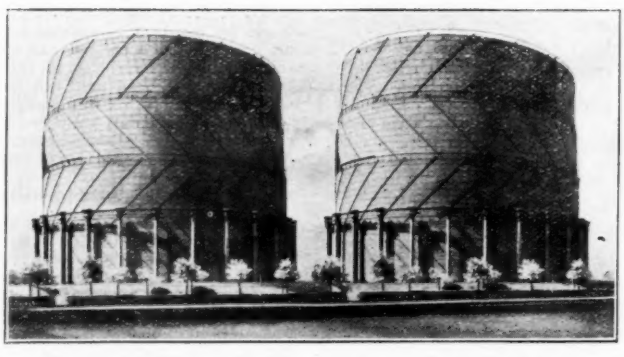

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the demand throughout the year may be considered satisfactory.

The Rupee profit for the year shewn at Rs. 172,230.07 is less by Rs. 38,874, which your Board consider satisfactory in view of the additional expenses we have had to meet during the year.

I do not think I need refer to any item in particular appearing in the London Revenue Account, so I will now turn to the General Balance Sheet. Our Reserve Account standing at £76,764 0s. 5d., is £3,265 19s. 11d. higher than at 31st December, 1934. During the year a portion of our Investments were sold, realising a profit of nearly £3,000. Other investments were made and the cost price of our Investments, less depreciation, now stands at £42,910 16s. 9d., as compared with the previous figure of £42,887 9s. 10d., the market value as at 31st December last being the satisfactory figure of £51,489.

I think these are all the comments I need make on the Accounts.

The Balance of Net Revenue is £21,389 11s. 9d. and the Directors recommend a final Dividend of 3½ per cent. on the Preference Shares and a final Dividend on the Ordinary Shares of 5 per cent. both less tax.

The number of Gas Public Lamps in use at the end of December was 2,397, some 650 less than the previous year. The Municipal Council of Colombo who control the Electricity Department are converting a number of the Public Gas Lamps to Electricity in spite of the efficient Public Gas Lighting that this Company has provided in Colombo for a considerable number of years. Our Contract with the Council for Public Lighting provides for a minimum of 2,000 lamps and as I have before stated there were at 31st December last some 2,397 actually in use.

At the last General Meeting, I referred to the order obtained to fix up the Governor of Ceylon's new residence with Special Gas Cooking and Hot Water Appliances. I am happy to state that this work was efficiently carried out and a letter has been received from the Governor's Aide-de-Camp expressing appreciation at the manner in which the Gas Company carried out the installation.

I now have pleasure in moving that the Report and Accounts be received and adopted.

Mr. ALEX. A. JOHNSTON seconded the resolution, which was carried unanimously.

The CHAIRMAN proposed:—

> "That a Dividend for the year ended 31st December, 1935, at the rate of Seven per cent. per annum upon the Preference Shares, less Income Tax and Ten per cent. per annum upon the Ordinary Shares, less Income Tax (both less Interim Dividend paid 1st October, 1935), be and is hereby declared, the Warrants to be payable on 24th April, 1936."

The Resolution was seconded by Brig.-Gen. GOLAND V. CLARKE and unanimously carried.

The CHAIRMAN then proposed the re-election of Brig.-Gen. Goland V. Clarke, C.M.G., D.S.O., as a Director. He said:—

> "It gives me very great pleasure. General Clarke is a very enthusiastic and hard-working Director who gives us the benefit of his knowledge of Gas affairs in other parts of the world, which we find very useful."

Major HERIOT R. GLEN in seconding endorsed the Chairman's remarks.

The Resolution was carried unanimously and Brig.-Gen. Clarke thanked the Meeting and assured them of his best endeavours.

Mr. S. J. TUNGAY proposed that Mr. William Cash, Junior, M.A., F.C.A., be re-elected as Auditor for the ensuing year at a fee of ninety guineas, which Mr. A. E. Hayes seconded and which was carried unanimously. The Chairman remarked that Mr. William Cash, Junior, was not merely a nominal Auditor but personally took part in the audit of the Accounts.

The CHAIRMAN proposed a Vote of Thanks to the Staff, both in London and Colombo. Colombo was a very nice place for visitors but to work there was a different thing. However, we have no fault to find with our Staff out there, they are very hard workers.

As regards London, Mr. Field is an admirable Secretary and we have an admirable Staff. They are not many in numbers, but they do work which in many instances requires a much larger staff.

Mr. S. J. TUNGAY seconded the Resolution which was carried unanimously.

The SECRETARY briefly responded.

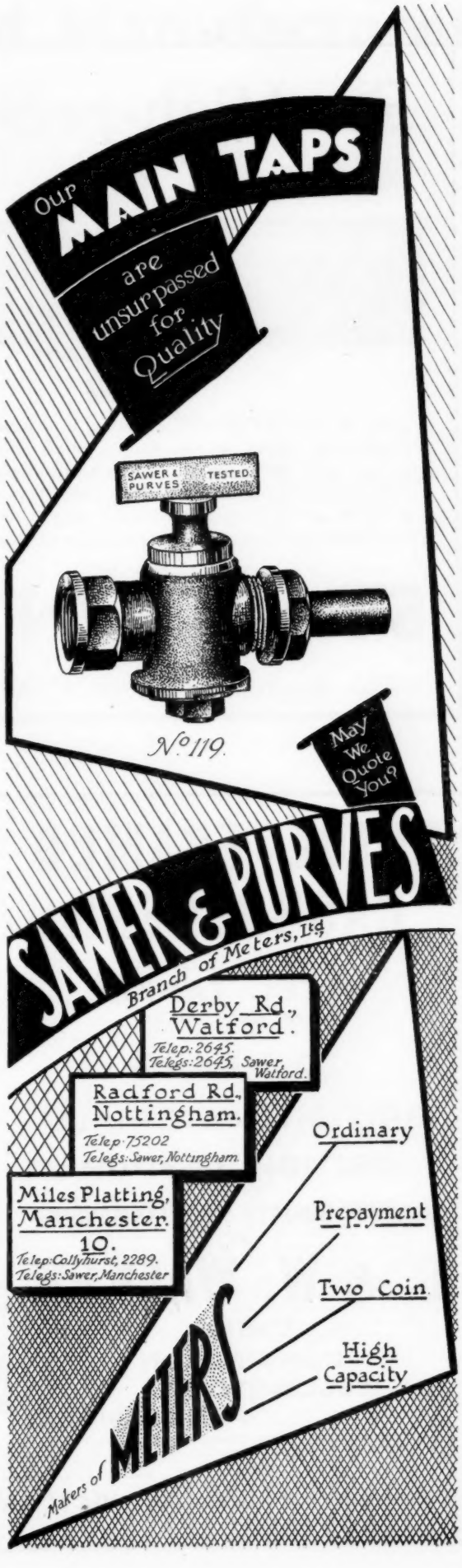
Mr. A. E. HAYES and Mr. S. J. TUNGAY seconded a vote of thanks to the Chairman and Directors, which was unanimously carried.

The proceedings then terminated.

Gas Undertaking Result

Haywards Heath.

The report of the Directors of the Haywards Heath District Gas Company for the year ended Dec. 31, 1935, states that the balance to the credit of the profit and loss account is £6,461, which it is proposed to deal with as follows: Final dividend at the rate of £10% per annum on the 5% consolidated stock for the half-year to Dec. 31, 1935, making £9%, less income-tax, for the year, £1,834; balance to be carried forward, £4,627. Gas sales show an increase of 1·36% for the year as compared with 1934. An issue of £8,861 4½% irredeemable preference stock was made in December at £109 4s. 7d.%. The new vertical carbonizing and coal handling plant has been completed, and was recently brought into action.



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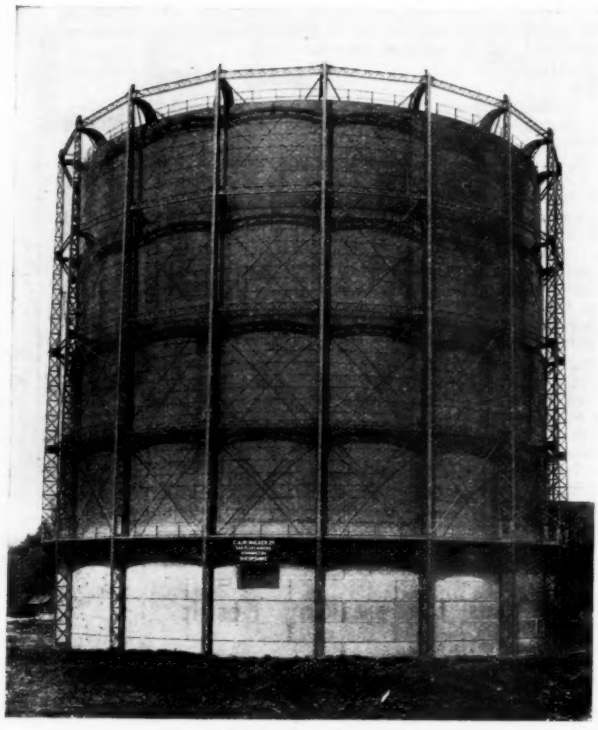

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Gas Markets and Manufactures

Stock Market Report

(For Stock and Share Lists, see later pages)

The increase in the income-tax came as rather a shock last week, though after reflection the Budget proposals as a whole were accepted philosophically in the City and caused little comment. At the opening on Wednesday prices were marked down slightly, especially those of gilt-edged stocks and tea shares, but the reactions were only temporary, and as the week progressed a heavy buying movement set in and markets closed firm. Home rails were a strong feature, and there were also some good rises among industrials, while, under the lead of the two Eagle companies, a large turnover was reported in the Oil Market.

The Gas Market was again well supported, and in many instances the prices of recorded transactions were a shade higher than those of the previous week, but the increases were not sufficient to justify any change in the quotations. Apart from a few *ex* div. markings, there were no movements of importance in the London Official List, though several improvements took place at the provincial Exchanges. At Nottingham a big jump of 25 points occurred in Long Eaton "A" stock to 180, and at this price the yield on an 8½% dividend (the rate paid since 1927) is nearly 4¾%, while the return on the "B" stock (7% dividend), which stands unchanged at 135, works out at £5 3s. 8d.%. The issues, however, are comparatively small and a holding would doubtless be difficult to obtain. At the local Exchange, Newcastle units recovered the previous week's drop of 3d., and Sheffield ordinary at the home Exchange hardened 2 points to 148½. In the Supplementary List there was a good demand for the Gas Light 3½% debenture stock, and business was recorded at a fraction higher than a week ago. United Kingdom ordinary shares, which were also well supported, moved up 6d. to 21s. 6d.

The accounts of the Cape Town and District Gas Light and Coke Company for the year to Dec. 31 last show a gross profit of £14,774 (against £16,834), and after allowing for interest charges and sinking fund premium the balance forward is reduced from £2,464 to £1,433, which leaves no margin for preference and ordinary dividends. No preference dividend has been paid since November, 1933, though it was regularly paid to that date, and the last ordinary dividend was distributed for the year 1932 at 5%. The report states that last year was an even more difficult one than 1934, and though labour and material costs increased it was deemed inadvisable to advance the price of gas. Industrial sales of gas, however, have begun to show a satisfactory increase, and high pressure mains have been laid to extend still further this branch of the Company's activities. The £10 ordinary shares are now quoted at £2.

Current Sales of Gas Products

The London Market for Tar Products.

April 27.

The position in the London Tar Products market is as follows:

Pitch, about 37s. 6d. per ton f.o.b.

Creosote, 5½d. per gallon.

Refined tar, 3¾d. per gallon in bulk at makers' works.

Pure toluole, about 2s. 7d.; pure benzole, 1s. 7d. to 1s. 8d.; 95/160 solvent naphtha, about 1s. 8d.; and 90/160 pyridine, about 4s. 3d. to 4s. 6d.—all per gallon naked at makers' works.

Tar Products in the Provinces.

April 27.

The average prices of gas-works products during the week were: Gas-works tar, 22s. 6d. to 27s. 6d. Pitch—East Coast, 38s. 9d. to 41s. 3d. f.o.b. West Coast—Manchester, Liverpool, Clyde, 38s. 9d. to 41s. 3d.* Toluole, naked, North, 2s. 2d. to 2s. 4d. Coal-tar crude naphtha, in bulk, North, 8d. to 8¼d. Solvent naphtha, naked, North, 1s. 6d. to 1s. 6½d. Heavy naphtha, North, 1s. 1d. to 1s. 2d. Creosote, *ex* works, in bulk, North, liquid and salty, 4⅝d. to 4¾d.; low gravity, 4⅜d. to 4⅝d. Heavy oils, in bulk, North, 5d. to 5¼d. Carbolic acid 60's, 2s. 4d. to 2s. 6d. Naphthalene, £24 to £26. Salts, 100s. to 105s., bags included. Anthracene "A" quality, 3d. to 3¼d. per minimum 40%, purely nominal; "B" quality, unsalable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *April* 25.

Trading is rather quiet in this area owing to the shortage of prompt supplies. A fair volume of business is being conducted, however, in road tar.

Crude gas-works tar.—The actual value is 34s. to 35s. per ton *ex* works in bulk.

Pitch.—The value is nominal at 35s. to 37s. 6d. per ton f.o.b. Glasgow for export and 35s. per ton *ex* works in bulk for home trade.

Refined tar.—Quotations are unchanged at 3¾d. to 4d. per gallon *ex* works in buyers' packages for home trade, and 3d. to 3¼d. per gallon for export.

Creosote oil.—There is a continued steady demand and prices are not lower than the following: B.E.S.A. Specification, 5¼d. to 5⅜d. per gallon; low gravity, 5¼d. to 5½d. per gallon; neutral oil, 5¼d. to 5½d. per gallon; all *ex* works in bulk.

Cresylic acid.—With prompt supplies practically unobtainable, values are nominal as under: Pale, 97/99%, 1s. 9d. to 1s. 10d. per gallon; dark, 97/99%, 1s. 7d. to 1s. 8d. per gallon; pale, 99/100%, 2s. to 2s. 3d. per gallon; all *ex* works naked.

Crude naphtha.—The small quantities available are commanding 5¼d. to 5⅜d. per gallon, according to quality and district.

Solvent naphtha.—90/160 grade is 1s. 5d. to 1s. 6d. per gallon, and 90/190 heavy naphtha is 1s. to 1s. 1d. per gallon.

Motor benzole is offered in small quantities at 1s. 3½d. to 1s. 4d. per gallon.

Pyridines.—90/160 grade is 5s. to 5s. 6d. per gallon, and 90/140 grade is 5s. 6d. to 6s. per gallon.

Benzole Prices.

These are considered to be the market prices for benzole at the present time:

	s.	d.		s.	d.	
Crude benzole	0	8½	to	0	9	per gallon at works
Motor ,,	1	2	,,	1	2½	,, ,, ,,
90% ,,	1	3	,,	1	3½	,, ,, ,,
Pure ,,	1	7	,,	1	7½	,, ,, ,,

Contracts Advertised To-Day

Carburetted Water Gas Plant.

Darlington Gas Department. [p. 301.]

Coal.

Wigan Gas Department. [p. 302.]

Conveying Plant (Spare Parts).

Halifax Gas Department. [p. 302.]

Cooker Renovation Plant.

Ilkeston Gas Department. [p. 302.]

Exhauster.

Plymouth Corporation Gas Department. [p. 301.]

Forced Draught Equipment.

Ilkeston Gas Department. [p 302.]

Gasholders.

Belfast Gas Department. [p. 301.]
Heywood Corporation. [p. 301.]

Paint.

Bexhill Gas Department. [p. 301.]

Painting Gasholders, &c.

Bexhill Gas Department. [p. 301.]

Pipe Laying.

Darlington Gas Department. [p. 301.]

Pipes.

Stockport Gas Department. [p. 301.]

Trade Notes

"Staveley" Metal Spun Cast-Iron Pipes.

We have received from the Staveley Coal and Iron Company, Ltd., a copy of their recently issued booklet on "Staveley" metal spun cast-iron pipes, 3 and 4 in. diameter, which gives, among other interesting information, a specification of these pipes.

New Plant for Newton-in-Makerfield.

The Newton-in-Makerfield Urban District Council have accepted tenders from the following firms for new plant: Purifiers and connections, R. & J. Dempster, Ltd., Manchester; foundations for purifiers, H. Horridge, Earlestown; washing plant and connections, R. & J. Dempster, Ltd., Manchester; coke-screening plant, R. Cort & Son, Reading; and coke de-breezing screen, Aldridge & Ranken, Bath. Ministry of Health sanction for a loan has been obtained, and the work will be commenced immediately.

J. Browett Lindley (1931), Ltd.

Recent orders received by J. Browett Lindley (1931), Ltd., include a 3,300 cu.ft. per minute single stage gas compressor driven by a four cylinder 340/370 B.H.P. gas engine for a Japanese gas-works. The unit is fitted with five-step fractional load control in conjunction with a variable speed governor, thus ensuring regularity of output pressure and minimum fuel consumption. It is of interest that this machine constitutes a second repeat order, others having been supplied by Messrs. Browett-Lindley in 1922 and in February of this year.

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THE **GRANGEMOUTH** CORPN. GAS DEPT. (2ND ORDER)
THE **JOHANNESBURG** MUNICIPAL GAS DEPT. (3RD ORDER)
THE **BALLYMENA** U.D.C. GAS DEPARTMENT (2ND ORDER)

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STOCK AND SHARE LIST

Official Quotations on the London Stock Exchange

Issue. £	Stock or Share	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Apl. 24.	Rise or Fall on Week.	Transactions Lowest and Highest Prices During the Week.
1,767,439	Stk.	Mar. 16	7	7½	Alliance & Dublin Ord. ...	150—160	...	...
374,000	,,	Dec. 16	4	4	Do. 4 p.c. Deb. ...	95—100	...	...
557,655	,,	Feb. 17	7	7	Barnet Ord. 7 p.c.	167—172	...	...
300,000	1	Mar. 30	1·4½	1·9½	Bombay, Ltd.	1¼—1½	...	...
179,305	Stk.	Mar. 2	9½	9½	Bournemouth sliding scale ...	218—228	...	222—224½
590,407	,,	,,	7	7	Do. 7 p.c. max. ...	169—174	...	170
493,960	,,	,,	6	6	Do. 6 p.c. Pref. ...	148—153	...	150
50,000	,,	Dec. 16	3	3	Do. 3 p.c. Deb. ...	85—90	...	...
262,025	,,	,,	4	4	Do. 4 p.c. Deb. ...	105—110	...	...
335,000	,,	,,	5	5	Do. 5 p.c. Deb. ...	125—130	...	...
357,900	,,	Feb. 17	7½	7½	Brighton &c., 6 p.c. Con. ...	170—175	...	...
649,955	,,	,,	6½	6½	Do. 5 p.c. Con. ...	155—160	...	158—159½
205,500	,,	,,	6	6	Do. 6 p.c. 'B' Pref.	144—149	...	...
855,000	,,	Mar. 2	7	8	British Ord.	158—163	...	160—162½
100,000	,,	Dec. 16	7	7	Do. 7 p.c. Pref.	153—158	...	...
350,000	,,	,,	5½	5½	Do. 5½ p.c. 'B' Cum. Pref.	110—115	...	...
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	96—101	...	...
450,000	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	107—112	...	...
200,000	,,	,,	17/6§	3½	Do. 3½ p.c. Red. Deb. ...	98—100	...	...
100,000	10	22 May '33	6	4	Cape Town, Ltd.	1—3	...	...
100,000	10	6 Nov. '33	4½	4½	Do. 4½ p.c. Pref. ...	1—3	...	...
150,000	Stk.	Jan. 6	4½	4½	Do. 4½ p.c. Deb. ...	81—86	...	...
626,860	,,	Feb. 3	6	6	Cardiff Con. Ord.	130—135	...	...
237,860	,,	Dec. 16	5	5	Do. 5 p.c. Red. Deb.	110—115	...	...
98,936	1	Apl. 20	2/-	2 -	Colombo, Ltd., Ord.... ...	1⅜—1⅝*	...	...
24,500	1	,,	1·4½	1·4½	Do. 7 p.c. Pref....	20/—22/-*	...	...
609,204	1	Mar. 30	-/11·48	- 11·48	Colonial Gas Assn. Ltd. Ord.	18/6—20/6	—/6	...
296,053	1	,,	1/3·30	1/3·30	Do. 8 p.c. Pref	22/6—24/6	—/6	...
1,775,005	Stk.	Feb. 3	5	5	Commercial Ord.	99—103	...	99
620,000	,,	Dec. 2	3	3	Do. 3 p.c. Deb. ...	85—90	...	86½—86½
286,314	,,	Feb. 17	5	5	Do. 5 p.c. Deb. ...	120—125	...	...
807,560	,,	,,	7	7	Croydon sliding scale ...	158—163	...	...
644,590	,,	,,	5	5	Do. max. div.	114—119	...	117—118½
620,385	,,	Dec. 16	5	5	Do. 5 p.c. Deb.... ...	121—126	...	...
239,000	,,	Feb. 3	5	5	East Hull Ord. 5 p.c.... ...	107—110	...	...
184,555	,,	Feb. 17	6	6	East Surrey Ord. 5 p.c. ...	130—135	...	...
176,211	,,	Dec. 16	5	5	Do. 5 p.c. Deb. ...	122—127	...	...
19,284,128	,,	Feb. 3	5½	5½	Gas Light & Coke 4 p.c. Ord.	27 6—28 6a	...	28/1½—28/6
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max.... ...	89—92	...	...
4,477,106	,,	,,	4	4	Do. 4 p.c. Con. Pref. ...	105—108	...	105½—107½
8,602,497	,,	Dec. 2	3	3	Do. 3 p.c. Con. Deb. ...	87—92	...	88½—89½
3,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	117—120	...	117½—118½
3,500,000	,,	,,	4½	4½	Do. 4½ p.c. Red. Deb. ...	114—117	...	115½—116½
270,466	,,	Feb. 17	6	6	Harrogate New Cons. ...	130—135	...	...
157,500	1	Mar. 16	1·7½	1·7½	Hongkong & China, Ltd ...	1⅞—1⅞	...	25/—25/3
213,200	Stk.	Mar. 2	6	6	Hornsey Con. 3½ p.c. ...	135—140	...	138
5,600,000	,,	Nov. 4	14	8	Imperial Continental Cap. ...	165—175	—2	167—172
223,130	,,	Jan. 20	3½	3½	Do. 3½ p.c. Red. Debs.	92—97	...	...
285,242	,,	Feb. 17	8½	8½	Lea Bridge 5 p.c. Ord. ...	175—180	...	176½
165,736	,,	Mar. 16	8	10	Maidstone 5 p.c. Cap. ...	180—190	...	...
63,480	,,	Dec. 16	3	3	Do. 3 p.c. Deb. ...	80—85	...	...
75,000	,,	Dec. 2	110	110	Malta & Mediterranean ...	200—210	...	...
392,000	—	Apl. 1	5½	5½	Metropolitan (of Melbourne) 5½ p.c. Red. Deb.	102—107	...	...
231,978	Stk.	Feb. 17	5	5	M.S. Utility 'C' Cons. ...	110—115	...	112½—113½
818,657	,,	,,	4	4	Do. 4 p.c. Cons. Pref.	102—107	...	...
360,075	,,	Dec. 16	4	4	Do. 4 p.c. Deb. ...	103—108	...	104½
148,955	,,	,,	5	5	Do. 5 p.c. Deb. ...	123—128	...	...
125,000	—	Jan. 2	3½	3½	Do. 3½ p.c. Rd. Rg. Bds.	96—99	...	...
675,000	Stk.	Nov. 18	†3	†3	Montevideo, Ltd.	66—71	+1	67½—70
225,000	,,	Feb. 17	7½	7½	North Middlesex 6 p.c. Con.	169—174	...	...
396,160	,,	Feb. 3	5	5	Northampton 5 p.c. max. ...	108—113	...	...
300,000	,,	Apl. 20	†9	†7	Oriental, Ltd....	165—170*	—2	...
416,617	,,	Dec. 16	8	8	Plymouth & Stonehouse 5 p.c.	166—171	...	...
504,416	,,	Feb. 3	8½	8½	Portsmouth & Gosport Cons.	170—175	...	...
241,446	,,	,,	5	5	Do. 5 p.c. max. ...	108—113	...	...
114,000	,,	Feb. 3	5	5	Preston 5 p.c. Pref.	110—115	...	...
355,698	1	Apl. 20	1/-	1/-	Severn Va'. Gas Cor. Ld. Ord.	20 6—22 6*	—/6	22 4½
454,510	1	Mar. 16	-/10½	-/10½	,, ,, 4½ p.c. Cum. Pref.	21/—23/-	...	22 -
133,201	Stk.	Feb. 17	8½	5	Shrewsbury 5 p.c. Ord. ...	147—152	...	...
90,000	10	27 May '35	†3	†3½	South African...	3⅞—4⅛	+⅛	...
1,061,779	1	Sept. 23	1·2½	1·2½	South East'n Gas Cn. Ld. Ord.	26 6—28 6	...	...
845,016	1	Mar. 16	-/10½	-/10½	Do. 4½ p.c. Red. Cum. Pref.	21/—23/-	...	21 3—22 6
200,000	1	,,	4	4	Do. 4 p.c. Cum. Pref. ...	20 9—21 9	...	...
450,000	Stk.	Feb. 17	4	4	Do. 4 p.c. Red Deb. ...	101—104	...	...
6,709,895	,,	Feb. 3	5	6½	South Met. Ord.	124—127	...	123½—126
1,135,812	,,	,,	6	6	Do. 6 p.c. Irred. Pf....	147—152	...	147—148
850,000	,,	,,	4	4	Do. 4 p.c. Irred. Pf....	104—107	...	105
1,895,445	,,	Dec. 16	3	3	Do. 3 p.c. Deb. ...	89—92	...	90½
1,000,000	,,	Jan. 6	5	5	Do. 5 p.c. Red. Deb.	114—117	...	116½
1,543,795	,,	Feb. 3	6	6	South Suburban Ord. 5 p.c....	131—136	...	133½
512,825	,,	,,	5	5	Do. 5 p.c. Pref....	122—127	...	123
500,000	,,	,,	4	4	Do. 4 p.c. Pref....	103—108	...	106½
888,587	,,	Dec. 16	5	5	Do. 5 p.c. Deb....	123—128	...	124½—128
250,000	,,	,,	4	4	Do. 4 p.c. Deb....	104—109	...	...
415,907	,,	Dec. 2	...	4	S. Western Gas & Water Ord.	23 —24/-	...	23 6—23 9
160,523	,,	Apl. 20	...	4½	Do. 4½% Red. Cum. Pref.	21 9—22 9*	—3	...
110,000	,,	Dec. 16	4	4	Do. 4½% Red. Deb. ...	98—103	...	...
647,740	,,	Feb. 3	5	5	Southampt'n Ord. 5 p.c. max.	113—118	...	...
121,275	,,	Dec. 16	4	4	Do. 4 p.c. Deb.	98—103	...	...
350,000	,,	Feb. 3	5½	5½	Swansea 5½ p.c. Red. Pref. ...	111—116	...	...
106,000	,,	Dec. 16	6½	6½	Do. 6½ p.c. Red. Deb. ...	96—101	...	...
94,000	,,	...	...	...	Do. 3½ p.c. Red. Deb. ...	96—101	...	...
1,076,490	,,	Feb. 17	6½	6½	Tottenham and District Ord.	149—154	...	151—153½
409,835	,,	,,	5½	5½	Do. 5½ p.c. Pref. ...	130—135	...	...
62,235	,,	,,	5	5	Do. 5 p.c. Pref. ...	122—127	...	...
371,850	,,	Dec. 2	4	4	Do. 4 p.c. Deb. ...	103—108	...	...
369,774	,,	Feb. 3	7	7	Uxbridge, &c., 5 p.c. ...	153—158	...	...
108,330	,,	,,	5	5	Do. 5 p.c. Pref. ...	122—127	...	126½
1,340,521	,,	Feb. 3	7	7	Wandsworth Consolidated ...	158—163	...	161—162½
1,371,373	,,	,,	5	5	Do. 5 p.c. Pref. ...	122—127	...	123—124½
1,317,964	,,	Dec. 16	5	5	Do. 5 p.c. Deb. ...	123—128	...	...
338,300	,,	,,	4	4	Do. 4 p.c. Deb. ...	104—109	...	...
499,735	,,	Feb. 17	6½	7½	Watford and St. Albans Ord.	155—160	...	...
200,000	,,	,,	5	5	Do. 5 p.c. Pref. ...	120—125	...	...
200,000	,,	,,	5½	5½	Do. 5½ p.c. Pref. ...	133—138	...	...
200,000	,,	Dec. 2	4	4	Do. 4 p.c. Red. Deb.	100—105	...	...
100,000	,,	,,	...	3½	Do. 3½ p.c. Red. Deb.	96—101	...	...
158,400	,,	Mar. 2	5	6b	Winchester W. & G. 5 p.c. Con.	112—117	...	...

a.—The quotation is per £1 of Stock. b.—Paid £3, including 10s. on account of back dividends. * Ex div.
† Paid free of income-tax. ‡ For year. § Actual for three months.

Stock and Share List continued overleaf.

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STOCK AND SHARE LIST—Cont.

Stocks Officially Quoted on Provincial Exchanges

Issue. £	Stock or Share	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations. Apl. 24.	Rise or Fall on Week.	Transactions, Lowest and Highest During the Week.
BRISTOL EXCHANGE.								
347,756	Stk.	Feb. 3	5	6	Bath Cons.	124—126	...	...
1,667,250	,,	Feb. 17	5	5	Bristol, 5 p.c. max.	119—121	...	...
120,420	,,	Dec. 16	4	4	Do. 1st 4 p.c. Deb. ...	103—105	...	...
217,870	,,	,,	4	4	Do. 2nd 4 p.c. Deb. ...	103—105	...	...
328,790	,,	,,	5	5	Do. 5 p.c. Deb.	125—128	...	...
274,000	,,	Feb. 17	5	5	Newport (Mon.) 5 p.c. max....	111—116	...	...
13,200	12	Mar. 16	7	8½	Pontyp'l Gas & W. 10 p.c. 'A.'	14—15	...	...
13,600	10	,,	5	6	Do. 7 p.c. B.'	11½—12	...	...
40,000	10	,,	5	6	Do. 7 p.c. 'C.'	11½—12	...	...
140,778	Stk.	Feb. 17	5	5	Weston-super-Mare Cons. ...	113—115	...	...
64,338	,,	Dec. 16	4	4	Do. 4 p.c. Deb.	98—100	...	...
33,340	,,	,,	7½	7½	Do. 7½ p.c. Deb.	165—169	...	...
LIVERPOOL EXCHANGE.								
137,150	Stk.	Feb. 3	5	6½	Chester 5 p.c. Ord.	107½—112½	...	...
92,500	,,	Dec. 16	4	4	Do. 4 p.c. Pref.	100—105	...	...
32,540	,,	,,	3½	3½	Do. 3½ p.c. Deb. ...	91—96	...	...
41,890	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	100—105	...	...
2,167,410	,,	Feb. 17	6	6	Liverpool 5 p.c. Ord. ...	135—137	...	...
245,500	,,	Dec. 16	5	5	Do. 5 p.c. Red. Pref. ...	103—108	...	...
306,083	,,	Jan. 6	4	4	Do. 4 p.c. Deb. ...	105—107	...	...
106,280	,,	Feb. 3	10	10	Preston 'A' 10 p.c. ...	202—212	...	...
189,219	,,	,,	7	7	Do. 'B' 7 p.c.	140—150	...	...
NEWCASTLE EXCHANGE.								
122,577	Stk.	Mar. 2	8	8	Blyth 5 p.c. Ord.	154—156	...	...
732,000	,,	Feb. 3	5	5	Hartlepool G. & W. Co. & New	117—119	−5	...
2,061,315	,,	Feb. 3	5	5½	Newcastle & Gateshead Con.	25 9—26 3*a*	+·/3	...
682,856	,,	,,	4	4	Do. 4 p.c. Pref. ...	106½—107½	...	...
776,706	,,	Dec. 16	3½	3½	Do. 3½ p.c. Deb. ...	100½—101½	...	...
277,285	,,	Oct. 21	5	5	Do. 5 p.c. Deb. '43...	105—106	...	...
209,820	,,	Mar. 2	8½	8½	South Shields Con.	165—170	...	...
299,542	,,	Feb. 3	6	6	Sunderland 6 p.c. max. ...	129—131	...	...
NOTTINGHAM EXCHANGE.								
542,270	Stk.	Feb. 17	7	10	Derby Con.	176—186	+1	...
55,000	,,	Dec. 16	4	4	Do. 4 p.c. Deb.	100—105	...	...
84,750	,,	Feb. 17	5	12	Long Eaton 'A' Ord. ...	175—185	+25	...
50,000	,,	,,	4	10	Do. 'B' Ord. ...	130—140	...	...
20,000	10	Dec 16	5	5	Do. 5 p.c. Pref. ...	10—12	...	...
80,000	Stk.	,,	5	5	Do. 5 p.c. Deb. ...	117—122	...	...
SHEFFIELD EXCHANGE.								
10,000	Stk.	Feb. 17	10	10	Great Grimsby 'A' Ord. ...	220—230	...	...
6,500	,,	,,	10	10	Do. 'B' Ord. ...	220—230	...	...
79,000	,,	,,	10	10	Do. 'C' Ord. ...	205—215	...	...
1,806,339	,,	Feb. 17	6	6	Sheffield Cons.	147—150	+2	...
95,000	,,	Dec. 16	4	4	Do. 4 p.c. Deb.... ...	100½—102½	...	...

a The quotation is per £1 of Stock.

Supplementary List of Stocks and Shares not Officially Quoted

202,152	Stk.	...	...	...	Ascot Ord.	119—124	...	122½
128,182	,,	...	...	...	Do. 5 p.c. Pref.	117—122	...	...
238,631	1	Nov. 4	5	5	Assd. Gas and Water Ord. ...	21/—23/-	...	...
323,681	1	,,	4½	4½	Do. 4½ p.c. Cum. Pref. ...	22/—23/-	...	...
150,000	Stk.	...	...	...	Do. 3½ p.c. Red. Deb. ...	...	...	99½—100
17,000	,,	Feb. 17	8	8	Bognor Orig. Ord. 'A' ...	175—185	...	...
62,210	,,	,,	8	8	Do. New Addl. 'A' ...	172—185	...	...
87,160	,,	,,	7	7	Do. New 7 p.c. max. ...	140—145	...	...
37,440	,,	Feb. 3	10	10	Cam.Univ. & Town 10 p.c.max.	210—220	...	...
125,970	,,	,,	7	7	Do. 7 p.c. max.	158—163	...	...
39,025	,,	,,	5	5	Do. 5 p.c. max.	108—113	...	...
65,000	,,	Mar. 2	7½	8½	Eastbourne 'A' 5 p.c. ...	160—165	...	...
198,000	,,	,,	6	7	Do. 'B' 3½ p.c.	133—138	...	...
112,312	,,	,,	5	5	Do. 5 p.c. Pref.	120—125	...	...
130,000	,,	Dec. 16	5	5	Do. 5 p.c. Deb.	122—127	...	...
250,000	1	Nov. 18	...	4	Gas Consolidation Ord. ...	20 6—22/6	...	21/6
250,000	1	,,	...	4	Do. 4 p.c. Red. Cum. Pref.	19 6—20 6	...	...
700,000	Stk.	...	...	...	Gas Light & Coke 3½ p.c. Rd. Db	101—103	...	102½—102¾
24,000	30	Feb. 3	8½	8½	Great Yarmouth 8½ p.c. max.	52—57	...	...
59,400	30	,,	7½	7½	Do. 7½ p.c. max.... ...	42—45	...	...
51,160	Stk.	Dec. 2	5½	5½	Do. 5½ p.c. Deb....	123—128	...	...
152,600	,,	Mar. 2	8	8	Guildford Cons.	185—195	...	...
54,055	,,	,,	5	5	Do. 5 p.c. Pref.	114—119	...	...
68,250	,,	Dec. 16	5	5	Do. 5 p.c. Deb.	120—125	...	...
156,600	,,	Feb. 3	7½	7½	Hampton Court Cons. ...	167—177	...	...
81,660	10	Feb 4,'35	5	9	Leatherhead Ord.	16—17	...	...
107,960	10	Mar. 16	4	5½	Mid Kent Ord.	9½—10½	...	9¾
230,940	Stk.	Feb. 17	10	10	Oxford & District Ord. ...	205—215	...	...
47,112	,,	,,	5	5	Do. 5 p.c. Pref.	118—123	...	...
50,000	,,	,,	6	6	Do. 6 p.c. Red. Pref. ...	113—118	...	...
126,193	,,	Nov. 18	7½	7½	Peterborough Ord.	160—170	...	...
64,990	,,	Mar. 16	7½	7½	Redditch Ord.	113—118	...	...
166,850	,,	Feb. 17	7	9	Romford Ord.	167—172	...	...
60,000	,,	,,	4	4	Do. 4 p.c. Pref.	97—100	...	...
44,000	,,	Mar. 16	5	5	Do. 5 p.c. Deb.	120—125	...	...
10,950	,,	Mar. 2	8	8	Ryde Ord.	165—170	...	...
136,191	,,	Feb. 3	5	7	Scarborough Ord.	128—138	...	...
27,825	,,	Feb. 3	8	8	Shanklin & Ventnor Cons. ...	152—162	...	...
40,643	,,	Mar. 2	7	7	Slough Ord.	147—152	...	...
221,000	,,	Dec. 16	5	5	Do. 5 p.c. Deb.	116—121	...	...
28,872	1	Nov. 4	5½	5½	S. Midland Gas Cpn.Ltd. Ord.	20/—22/-	...	...
28,866	1	Mar. 16	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	19 6—21 6	...	...
137,730	Stk.	Feb. 17	7	7	Southgate & Dist. 7 p.c. max.	148—153	...	...
62,500	,,	,,	5	5	Do. 5 p.c. Pref.	115—120	...	...
117,228	,,	Mar. 2	5	6	Swindon Cons.	111—116	...	...
60,425	,,	Dec. 16	5	5	Do. 5 p.c. Deb.	122—127	...	...
50,000	1	Mar. 30	...	5·52d.	*a* Utd. Kingdom Gas Cpn. Ord.	20 6—22/6	+·/6	20/7½—21/9
760,910	1	,,	2½	2½	Do. 4½ p.c. Prefd. Ord....	20/—22/-	...	20 3
110,910	1	,,	...	2½	Do. 4½ p.c. Cum. Pref. ...	20 6—22 6	...	21,6—22/-
900,000	Stk.	Mar. 16	...	3½	Do. 3½ p.c. Red. Deb. ..	98—101	...	100¼
130,000	,,	Feb. 3	5	8	Wakefield Ord.	140—145	...	...
81,650	,,	,,	5	5	Do. 5 p.c. max.	105—110	...	...
500,000	,,	...	...	...	Wandsworth 4 p.c. Pref. ...	104½—106½	...	105½—105¾
82,000	,,	Feb. 3	6	6	Weymouth Ord.	106—111	...	...
98,384	,,	Feb. 3	6	6	Wolverhampton 6 p.c. Pref.	127—132	...	...
160,000	,,	Dec. 16	5½	5½	Do. 5½ p.c. Rd. Db	107—112	...	...
370,000	,,	Feb. 3	4	6	York Cons.	108—113	...	...
90,000	,,	Dec. 16	5	5	Do. 5 p.c. Red. Deb. ...	103—108	...	...
133,640	,,	Feb. 3	6½	6½	Yorktown (Cam.) 5 p.c. Cons.	127—132	...	...
120,000	,,	,,	5	5	Do. 5 p.c. Pref.	115—120	...	...
35,000	,,	Dec. 16	5½	5½	Do. 5½ p.c. Deb.... ...	130—135	...	...

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